High Volume Air Sampler

SNOW WHITE

SENYA FINLAND

High Volume Air Sampler

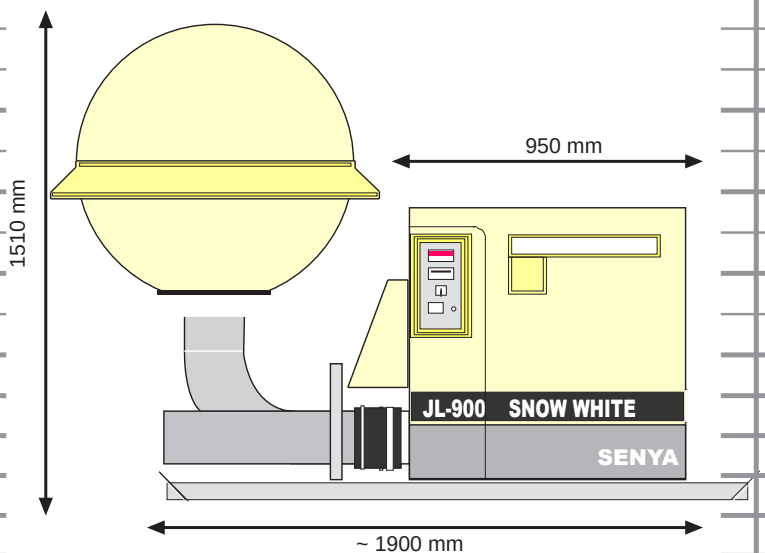
SNOW WHITE

JL-900 SNOW WHITE is a high volume air sampler. It´s ment for hard, continuous outdoor use. The baseframe structure is so strong that whole unit can easily be installed even on four rocks if neccessary. For installation just connect the mains cord and start sampling.

SNOW WHITE is very easy to use and in the designing work users opinions were listened carefully. Pump control can be made with frequency converter thus giving possibility for changing volume flow. Panel meters are microprocessor based and they do all neccessary calculations that you need; total volume and total time.

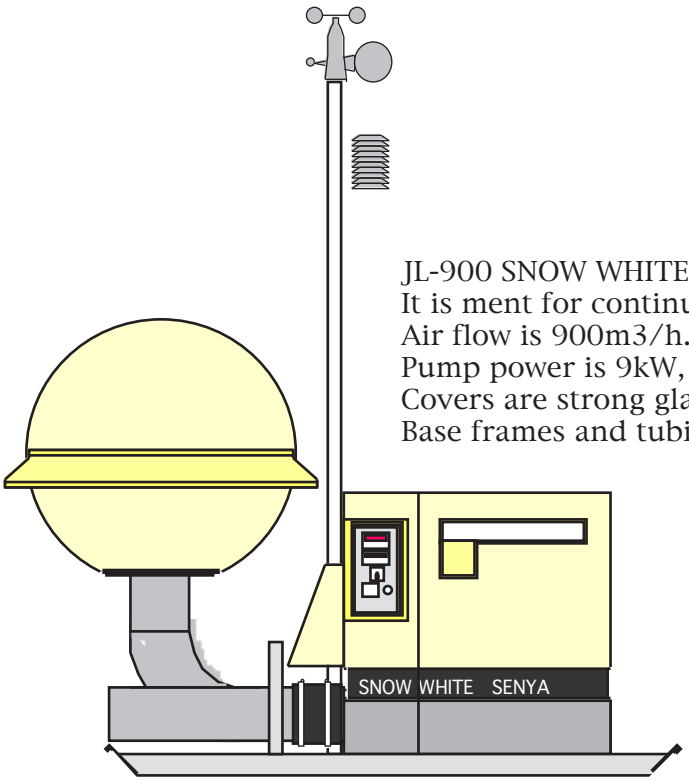
Air volume is calculated from pressure difference over calibrated orifice, also in carbon line. Carbon line is equipped with valve, so it can be closed totally.
Pressure drop when using Whatman GF/A glass fiber filter is c.10.000 Pascals. Pumps maximum efficiency is 20.000 Pascals so there is lots of reserve power to hold volume flow stable even when filter gets filled.
Filter cassette, which is made of aluminium, can be loaded already in laboratory thus avoiding problems with rain and wind outside. Pipes and supporting frames are made of stainless steel which is electrochemically polished after fabrication. GRP, glass reinforced plastic covers are thick enough to withstand even small flying stones or hammering. GM-probes can be installed to measure radiation concentration on filter.They can be used for emergency preparedness purposes; early warning system.

Technical data

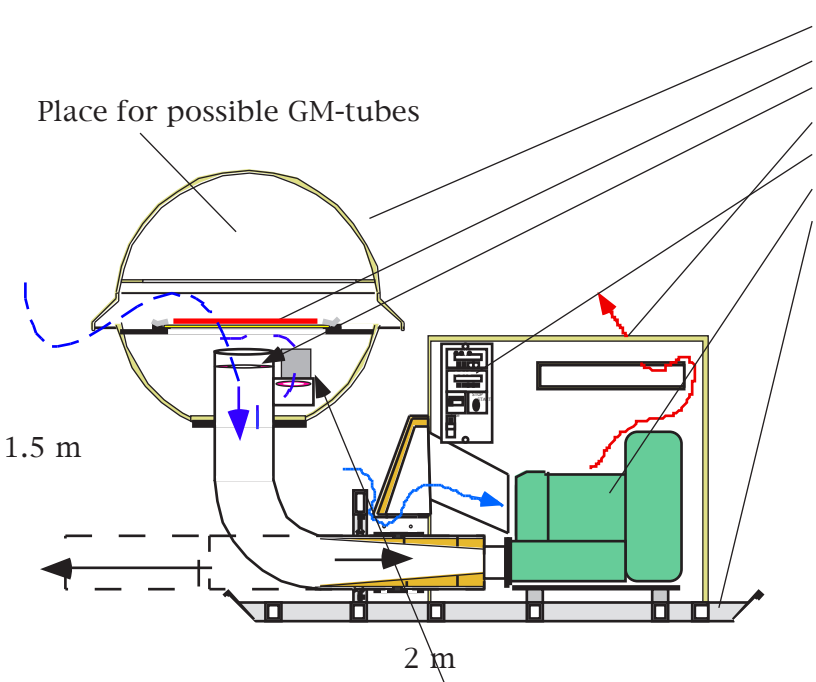


Gas ring vacuum pump	NASH- ELMO-G
Power norm / max.	6kW / 9 kW
Vacuum max.	200 mbar
Volume flow, filter	300-900 m^3/ h
carbon	0 - 14 m^3/ h
Filter size, particle	570 x 460 mm
Filters: Whatman GF/A,	Macherey-Nagel-
Camfil A600G,	MN 85 / 90
Carbon	0.5 l
Covers	GRP, glass
	reinforced plastics
Air Pipes, frames	Stainless steel
Aluminium parts	Anodized
PDTs	HUBA Control
	VAISALA
Panelmeters	NOKEVAL
Datalogger	VAISALA
Weight	400 +/-10kg

SNOW WHITE. OUT and IN



JL-900 SNOW WHITE is a powerful aersol sampler.
It is ment for continuous hard outdoor use.
Air flow is 900m3/h.
Pump power is 9kW, 3-phase.
Covers are strong glass reinfoced plastics (GRP)
Base frames and tubing are Stainless Steel (AISI 304)

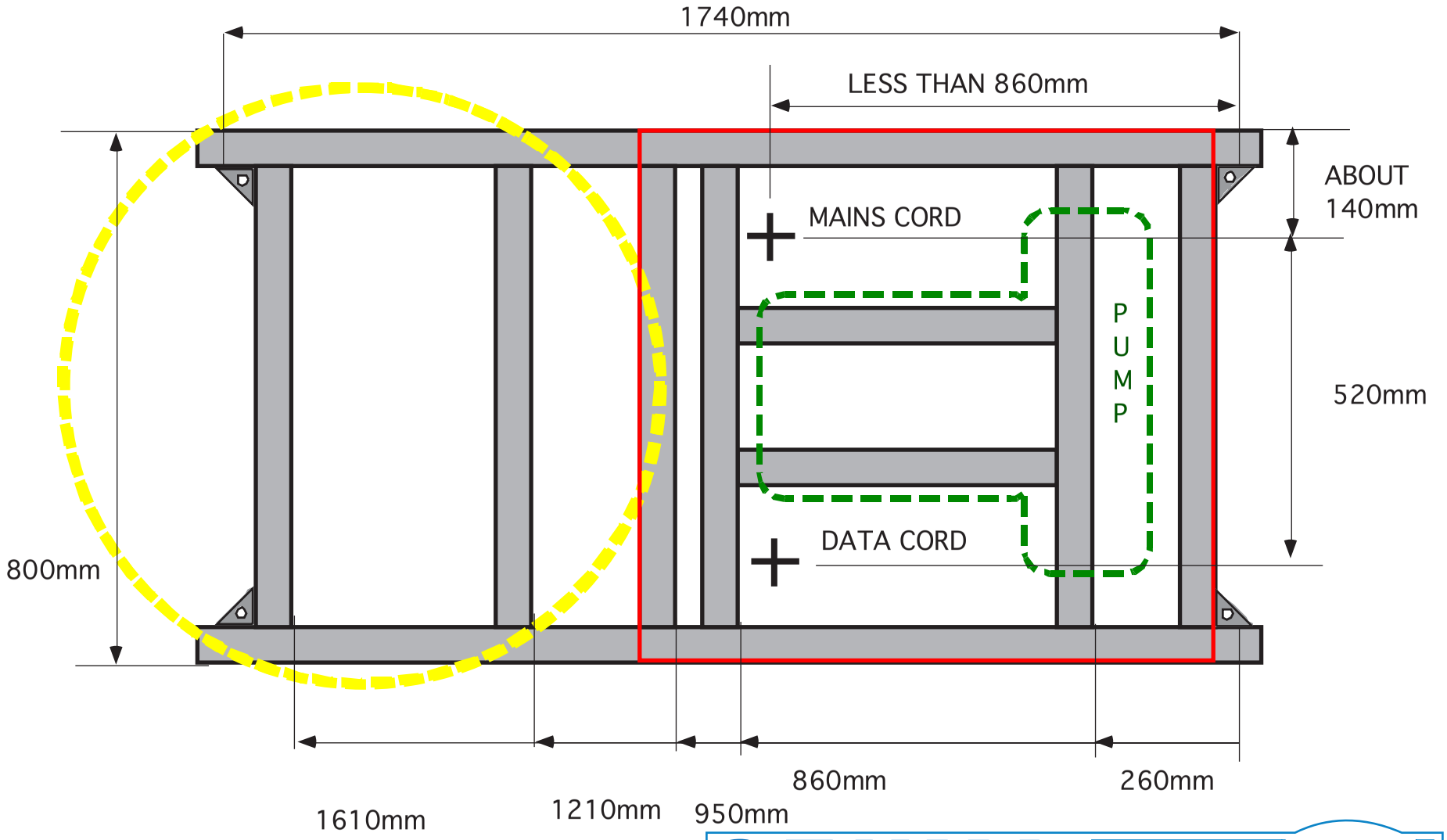


1. Intake Sphere
2. Filter
3. Flow measuring orifice
4. Pump Cover
5. Measuring Unit
6. Pump
7. Base Frame

- Covers are made of GRP, glass reinforced plastics
- Particle filter is on EPDM-rubber gasket.
- Activated carbon holder. Not in CTBTO sampler.
- Pressure difference orifices.
- Silencers.
- Vibration dampers.
- Tube gasket of neopren rubber.
- Stainless steel base frame

SNOW WHITE BASEFRAME
CONSTRUCTED OF 60 X 80mm AISI304 TUBE, WALL 3mm.

SNOW WHITE



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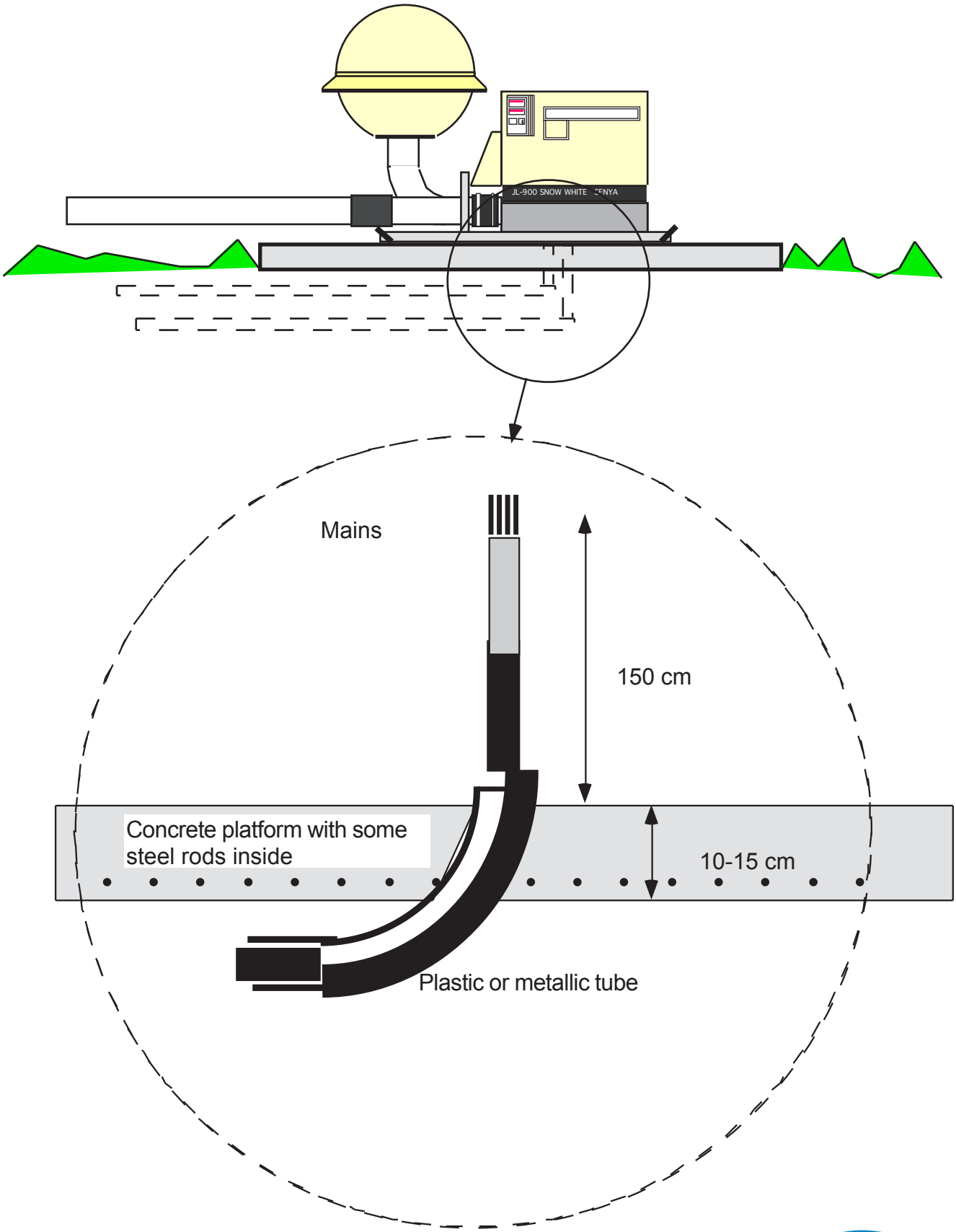
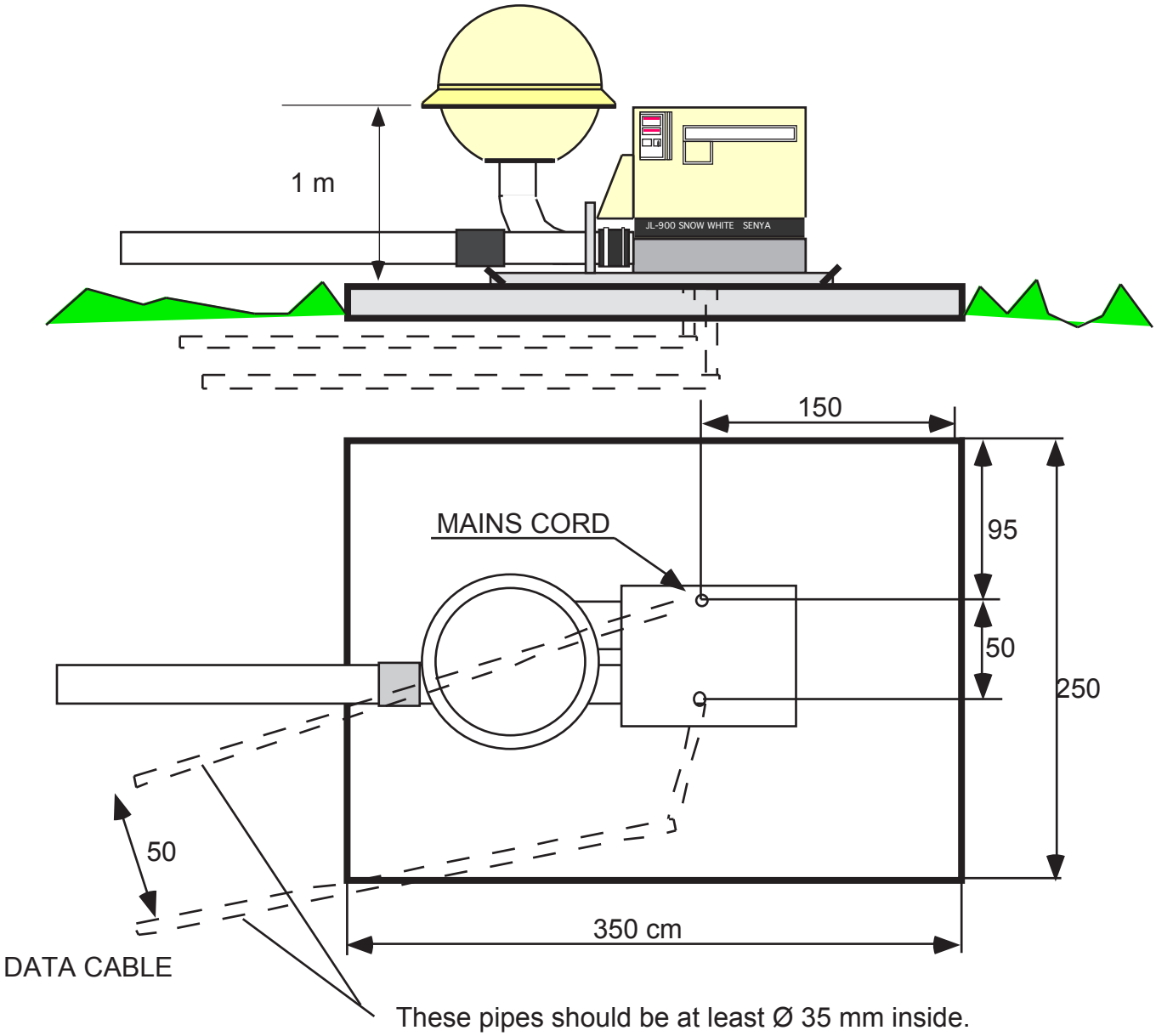
SNOW WHITE

INSTALLATION OF JL-900 SNOW WHITE





SNOW WHITE does not neccessary need any platform for installation. However if she is installed on the ground it is a good thing to cast a concrete platform fro installation. This platform should be wide enough so that station operator can work on it when changing filters or doing service work.

JL-900 SNOW WHITE is normally placed on a concrete platform, 10-15 cm thick. Normally customer leads electricity and data cables to sampler,under ground for safety reasons. For that purpose there should be placed pipes, tubes for them before laying the concrete. Cables should run c. 50 cm apart from each other.

Electricity cable: for pump UNIT, 3- phases, 1,2,3+0+PE, depending on distance, 9kW.
for measuring unit: 1-phase, 1+0+PE from stations UPS, 250W.

Data cable: We will provide when we know the needed length.

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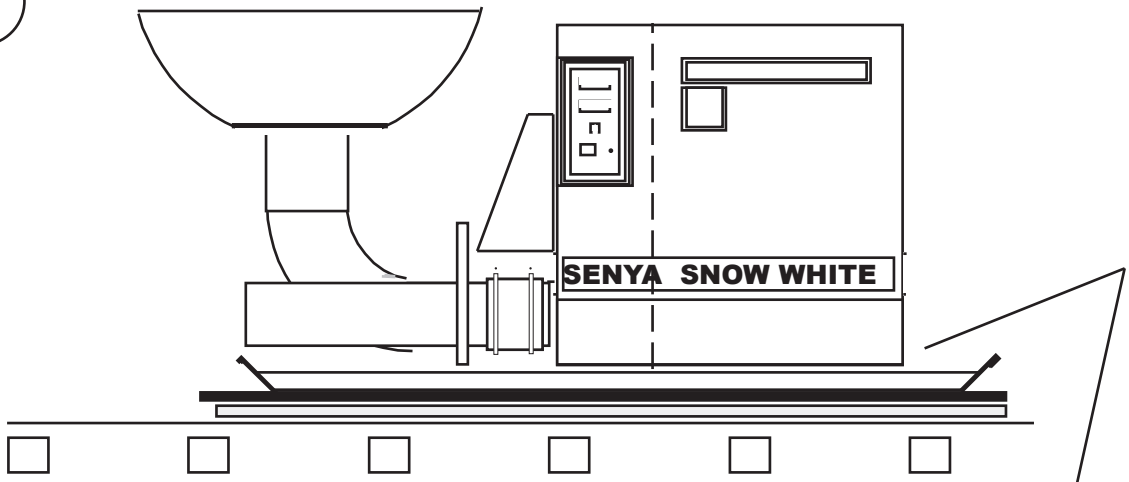
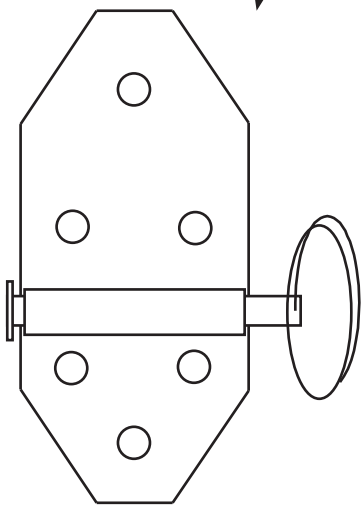
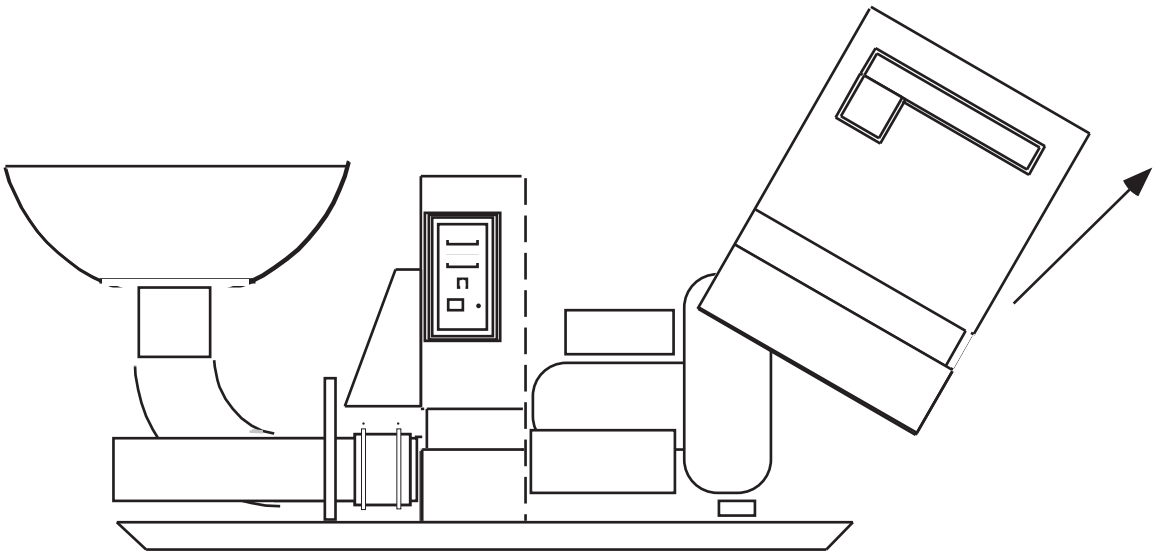




1. Take OFF the lock springs
2. Pull OUT the shafts
3. Now you can lift OFF the pump unit cover
4. This can be done if there are difficult place where the air sampler has to be lifted

SENYA SNOW WHITE



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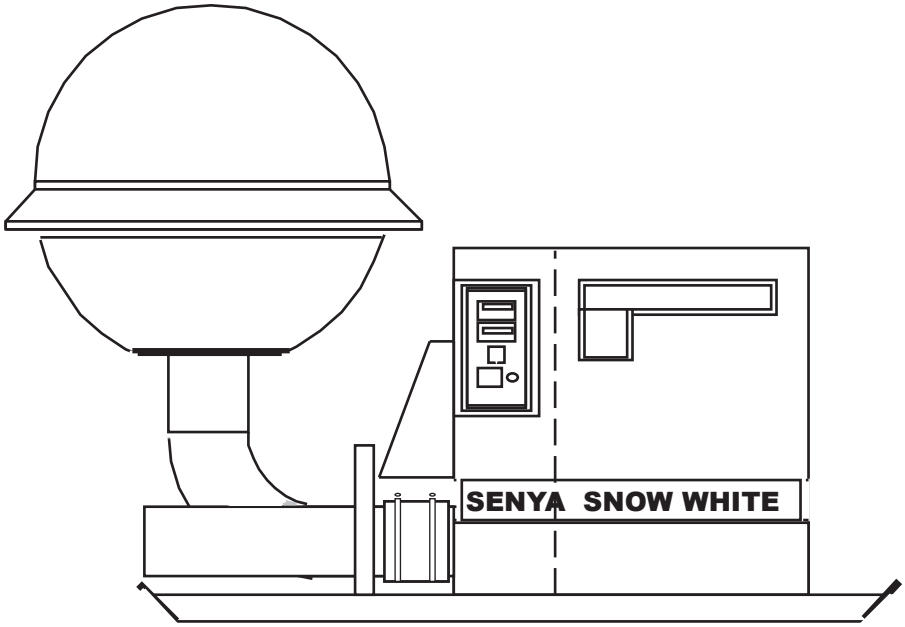
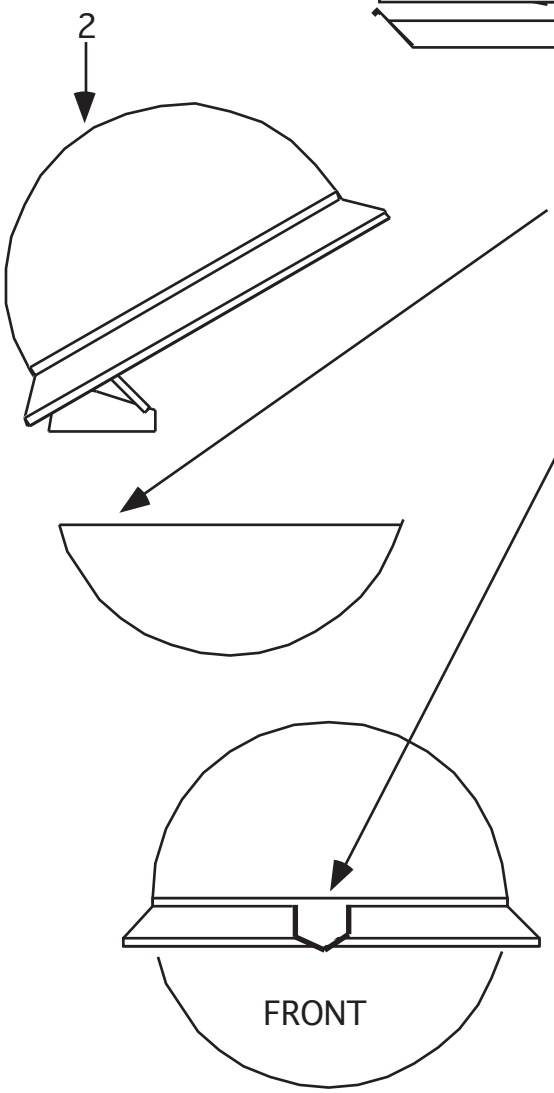
Air Samplers for Radiation Detection





INSTALLING THE UPPER PART OF INTAKE SPHERE

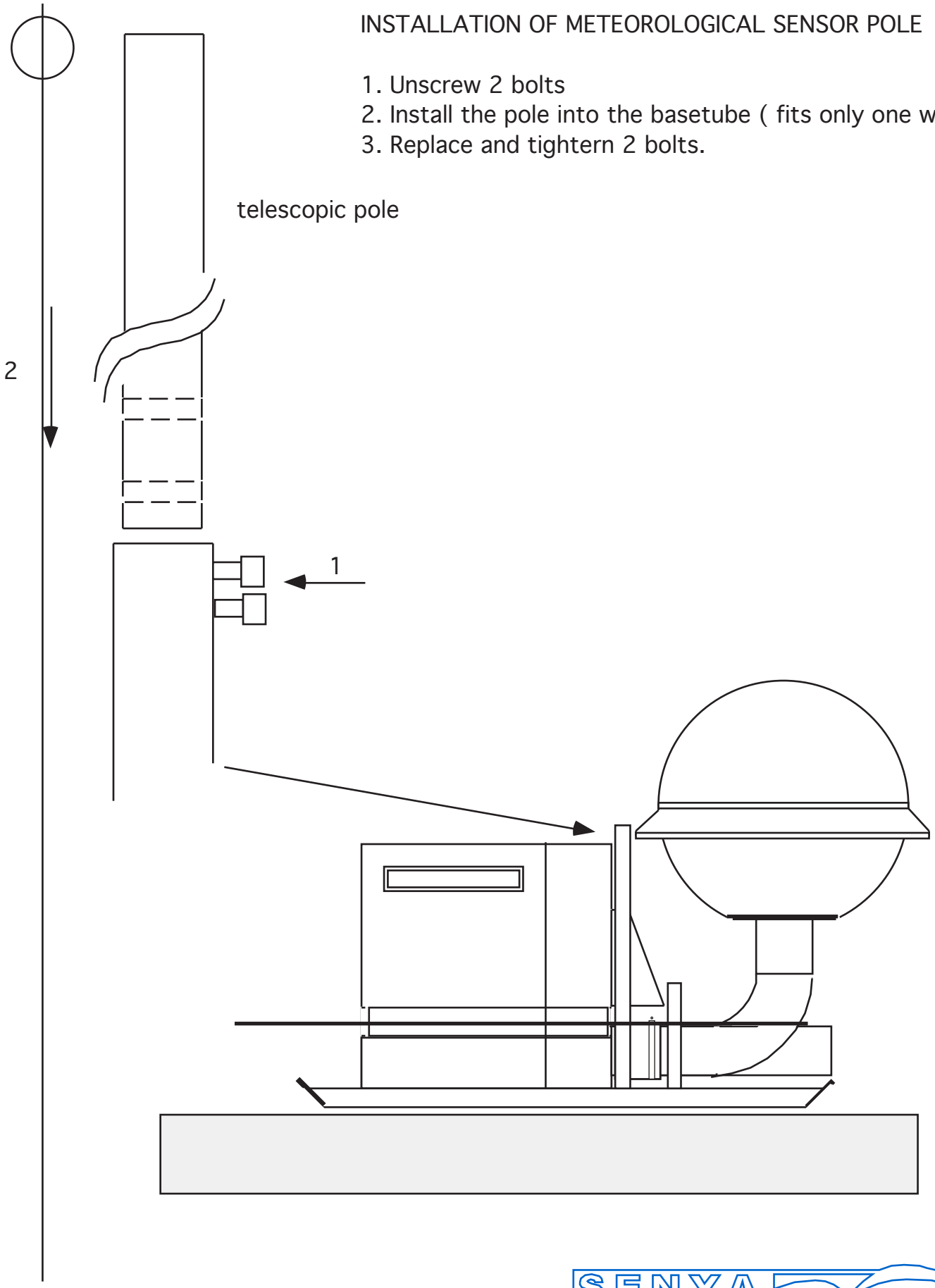
1. Take OFF 4 nuts and spacers from lower part.
2. Lift upper part on its place
3. Replace 4 spacers and nuts
4. Tighten them only a little
5. Shut the sphere
6. Check from the front side that the locking device is in the middle, if Ok tighten the nuts.

SNOW WHITE

INSTALLATION OF METEOROLOGICAL SENSOR POLE 9

1. Unscrew 2 bolts
2. Install the pole into the basetube (fits only one way)
3. Replace and tightern 2 bolts.

telescopic pole



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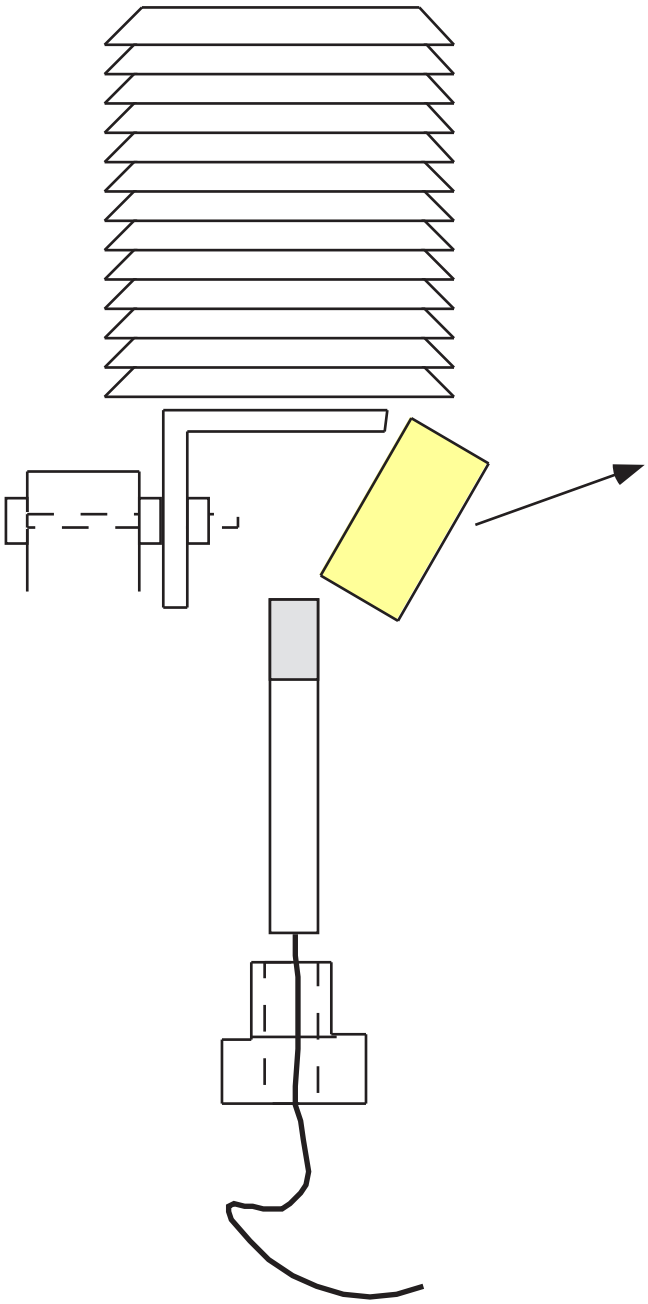
Air Samplers for Radiation Detection

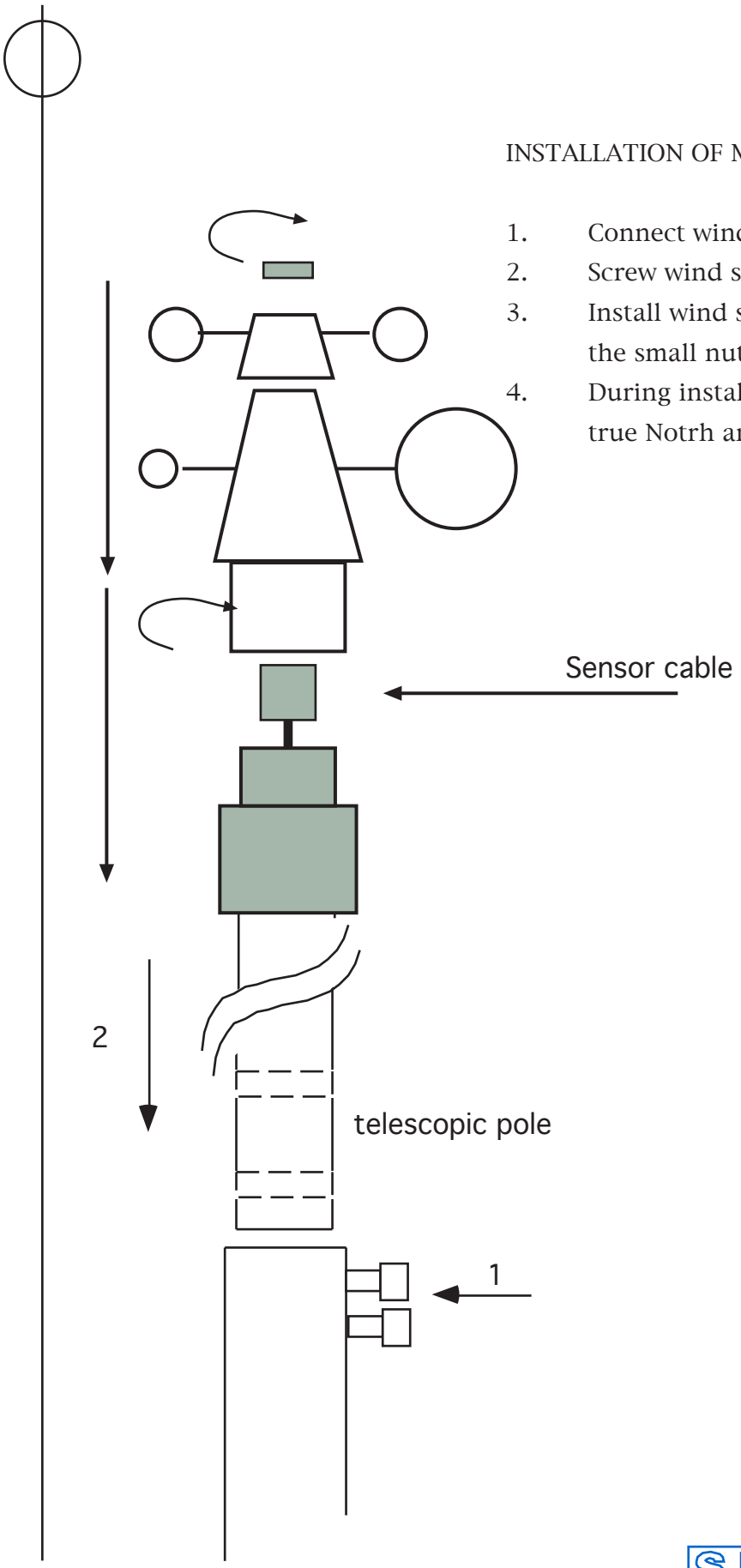
INSTALLATION OF HUMIDITY & TEMPERATURE SENSOR

1. Unscrew plastic nut
2. Uninstall sensor.
3. Take off yellow cap.
3. Screw sensor in place

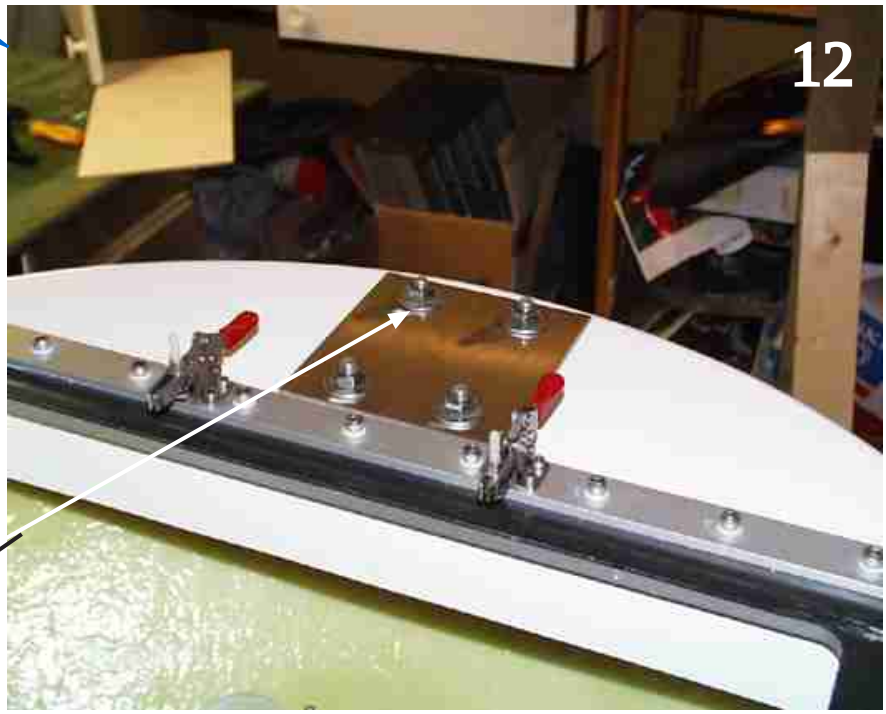


INSTALLATION OF METEOROLOGICAL SENSOR POLE

1. Connect wind sensor cable to windsensor element.
2. Screw wind sensor element to pole connector.
3. Install wind speed sensor to the top and tighten the small nut; do not forget the O-ring.
4. During installation check from data string the true Notrh and align sensor pole accordingly.



INSTALLATION OF UPPER SPHERE



1. Open the nuts in the lower sphere.
   - Lift up also the washers.

2. Lift upper sphere on its place.
BEWARE OF TAMPER SWITCH!

3. Check that the locking spring is in right position and tighten the upper sphere hinge nuts.

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Air Samplers for Radiation Detection

INSTALLATION OF METEOROLOGICAL SENSORS

1. Rain fall sensor.
2. Temperature and Humidity sensor.
3. Telescopic pole for wind sensor.

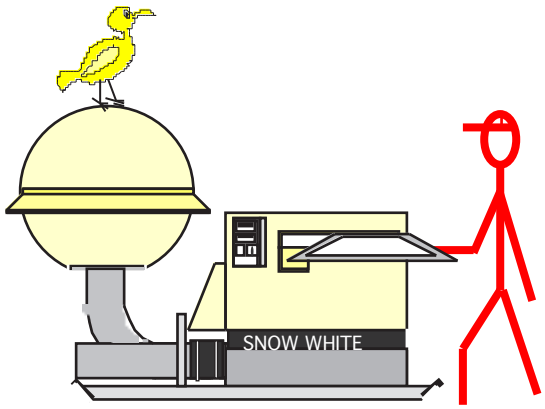
1. Install the cross arm on two bolts.

1. Take OFF the yellow cap from Hum. & Temp sensor and replace the sensor.
2. Install the wind sensor to the top of black pole.
3. Lift the black pole to the lower aluminum pole and secure two screws.
4. Check that the true notrh is at right place. if not turn the lower aluminum pole.

SNOW WHITE.CTBTO

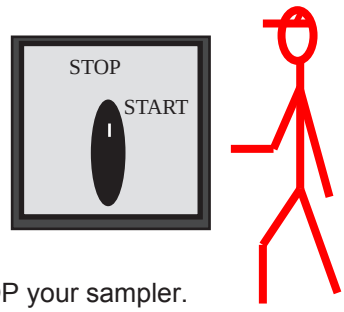
?

1

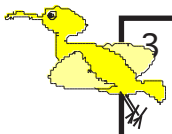


Go to the sampler. Take with you.
- New filter cassette

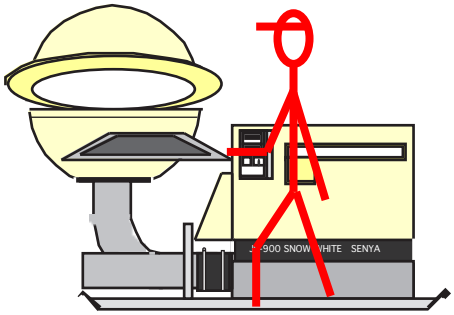
2



STOP your sampler.



3

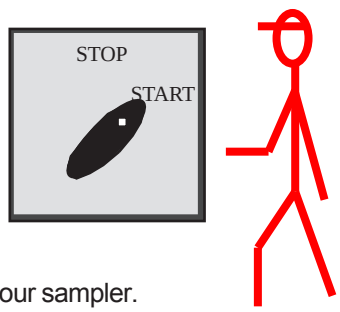


Change the filter.

Filter changing is simple, because measuring unit knows when the sampling is stopped or started and and it starts and stops accordingly new data calculation.

SAME ROUTINE NEXT TIME.
GOOD LUCK.

4

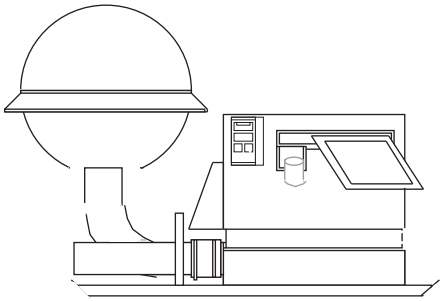


START your sampler.

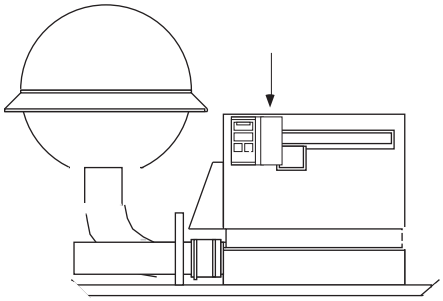
TAKE WITH YOU:

1. NEW FILTER + C0VER
3. KEYS

PUT FILTER CASSETTE
IN SHELTER

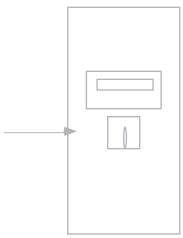


OPEN THE MEASURING
UNIT DOOR
STOP THE AIR SAMPLER

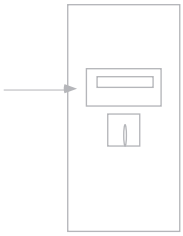


WRITE DOWN THE
PRESSURE
DIFFERENCE VALUES, CH A
IN MEASURING SHEET FROM

STOP THE AIR SAMPLER
AND WRITE THE TIME IN
MEASURING SHEET

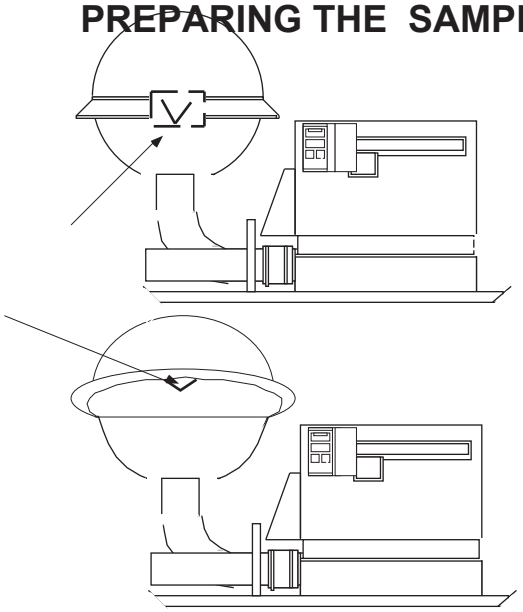


WRITE DOWN THE VALUES IN
CH AB=.....m ^{3}AND
CH C=.....hours / min
FROM PANEL METER

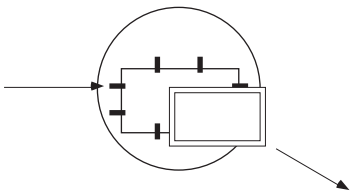


PREPARING THE SAMPLES

OPEN THE FILTER UNIT COVER.
HANDLE IS IN THE MIDDLE, UNDER
THE LID.

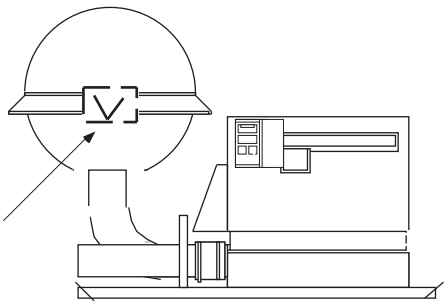


OPEN THE 8 CLAMPS, THAT HOLD
THE FILTER CASSETTE IN PLACE.
REMOVE THE OLD FILTER.

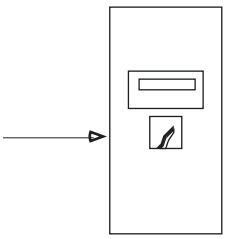


PLACE NEW FILTER CASSETTE
AND CLOSE THE CLAMPS.

CLOSE THE FILTER UNIT COVER.

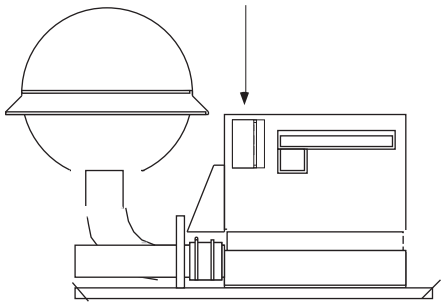


START THE AIR SAMPLER
WRITE DOWN THE TIME IN MEASURING SHEET.
LET METERS SETTLE DOWN 1 MIN AND READ
CH A READINGS.



CLOSE THE MEASURING UNIT DOOR.

REMEMBER TO TAKE AWAY WITH YOU
THE OLD FILTER CASSETTE
AND MEASURING SHEET.
DON´T FORGET THE KEYES.



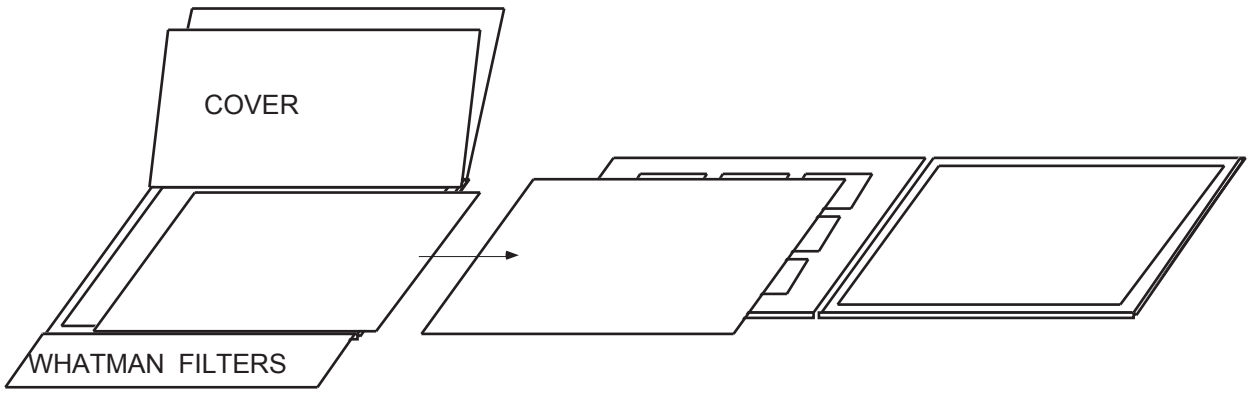
IN THE LABORATORY

ALWAYS CLEAN THE FILTER CASSETTE WITH ETANOL ALCOHOL BEFORE YOU PUT NEW FILTER IN.

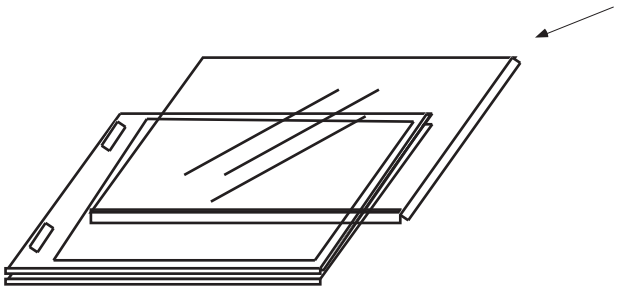
1. OPEN THE FILTER CASSETTE

2. TAKE ONE FILTER PAPER FROM THE FILTER PACKAGE. NEVER TAKE THE COVERING PAPER. TAKE ONLY ONE (1) FILTER.

3. PUT IT CAREFULLY ON THE CASSETTE AND CLOSE THE CASSETTE.



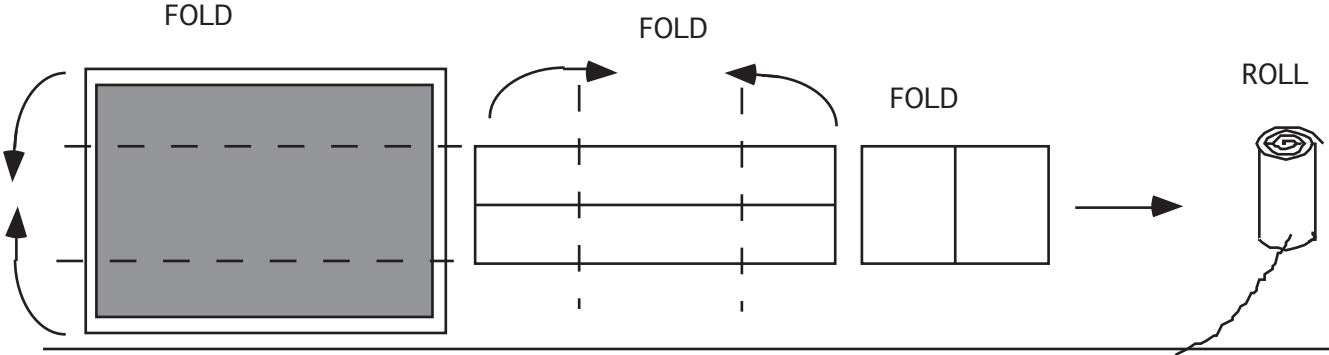
4. PUT THE PLASTIC COVER OVER THE CASSETTE.



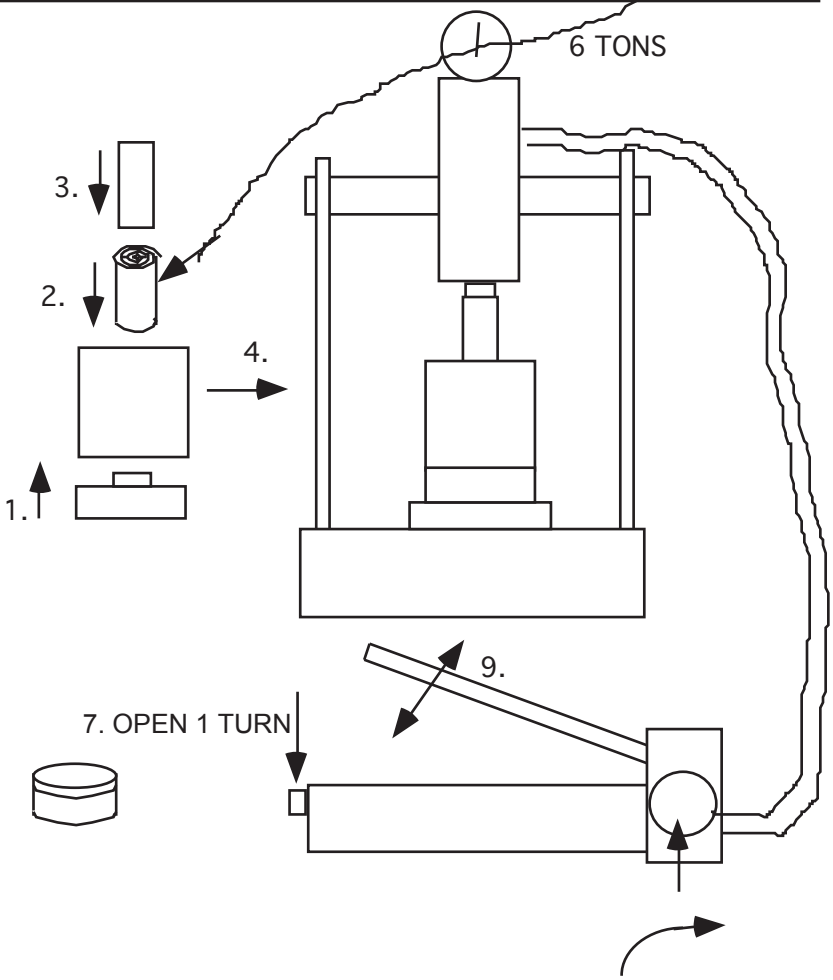
PREPARING THE

1. OPEN THE FILTER CASSETTE

2. FOLD THE FILTER MANY TIMES AND FINALLY ROLL IT TO FIT IN THE PRESSING TOOL



3. PUT THE PRESSING TOOL BOTTOM IN PLACE 1.
4. PUT THE FILTER ROLL IN THE PRESSING TOOL
5. PUSH THE PISTON IN THE PRESSING TOOL
6. PUT IT IN THE HYDRAULIC PRESS.
7. OPEN THE SMALL BUTTON ONE TURN (AIR INTAKE)
8. CLOSE THE VALVE
9. PRESS WITH THE HANDLE SO MANY TIMES THAT THE METER SHOW C. 6 TONS.
10. OPEN THE VALVE, BY TURNING TO LEFT
11. TAKE OFF THE PRESSING TOOL
12. TAKE OFF THE BOTTOM AND USE THE PISTON TO PUSH THE TABLETT OUT INTO THE WILLIAMS P-35 PLASTIC HOLDER.



ALWAYS REMEMBER TO MARK THE SAMPLE ID INFORMATION.

SENYA FINLAND

SNOW WHITE

PREPARING THE SAMPLES

1. OPEN THE FILTER CASSETTE

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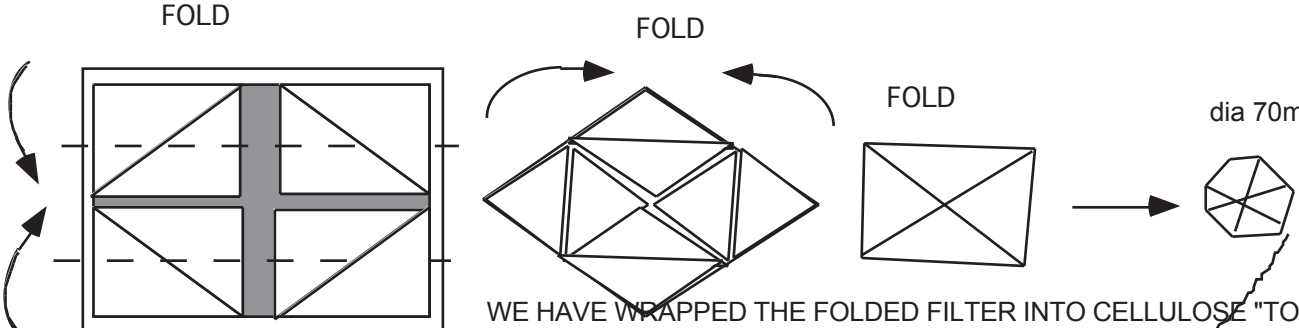
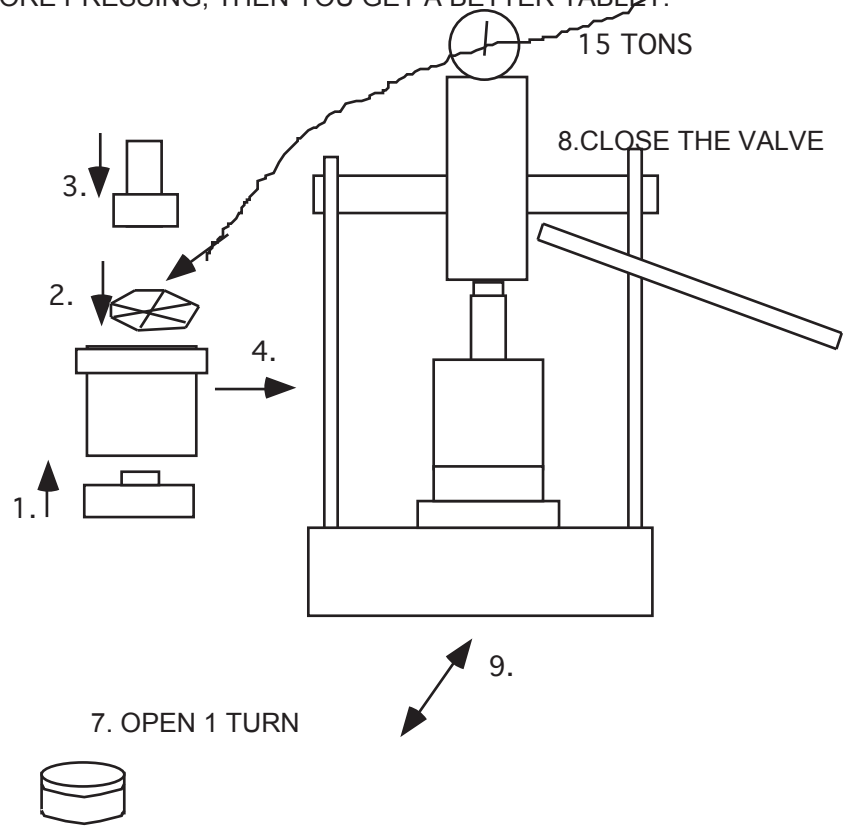
2. FOLD THE FILTER MANY TIMES AND FINALLY FIT IT IN THE PRESSING TOOL



WE HAVE WRAPPED THE FOLDED FILTER INTO CELLULOSE "TOWEL"
BEFORE PRESSING, THEN YOU GET A BETTER TABLET.

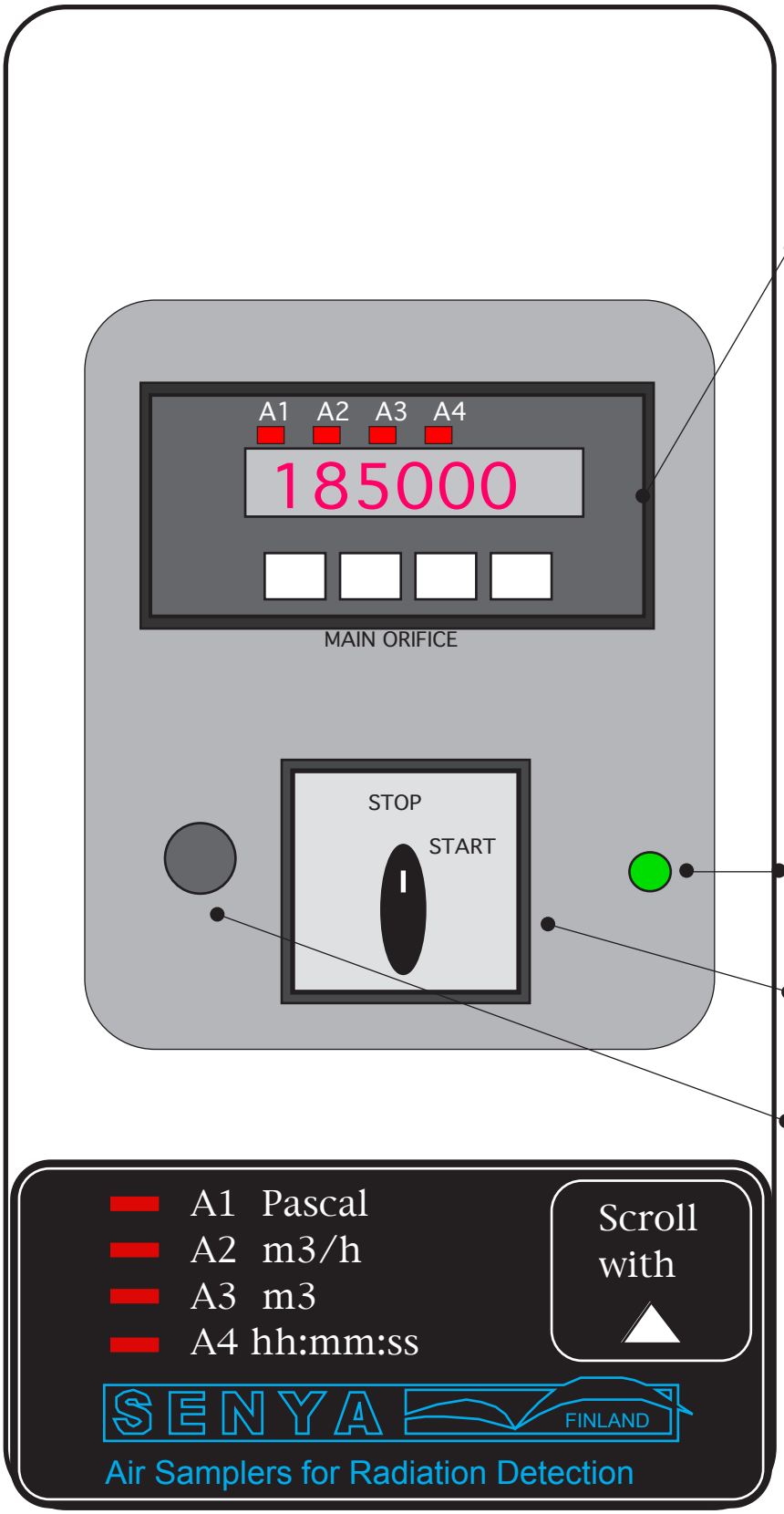
3. PUT THE PRESSING TOOL BOTTOM IN PLACE 1.
4. PUT THE FILTER ROLL IN THE PRESSING TOOL
5. PUSH THE PISTON IN THE PRESSING TOOL
6. PUT IT IN THE HYDRAULIC PRESS.
7. OPEN THE SMALL BUTTON ONE TURN (AIR INTAKE)
8. CLOSE THE VALVE
9. PRESS WITH THE HANDLE SO MANY TIMES THAT THE METER SHOW C. 15 TONS.
10. OPEN THE VALVE, BY TURNING TO LEFT
11. TAKE OFF THE PRESSING TOOL
12. TAKE OFF THE BOTTOM AND USE THE PISTON TO PUSH THE TABLETT OUT INTO THE WILLIAMS P-70? PLASTIC HOLDER.



ALWAYS REMEMBER TO MARK THE SAMPLE ID INFORMATION.

ALWAYS REMEMBER TO USE SAFETY GLASSES WHEN USING HYDRAULIC PRESS.

CONTROL PANEL



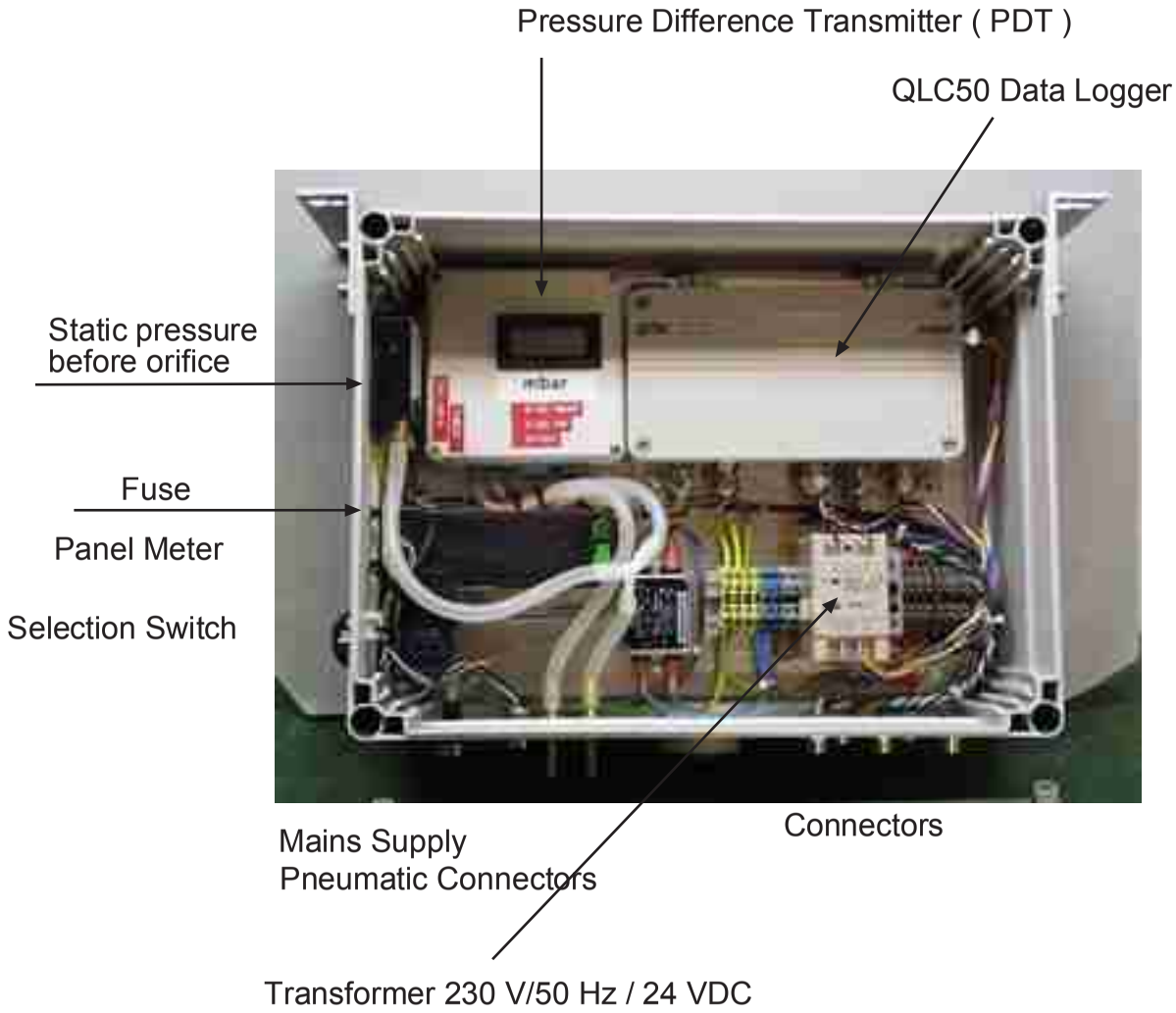
PANEL METER
SHOWS FILTERLINE VALUES. Panel meter calculates and stores calculated total volume and time. These values stay in memory till the start / stop switch is turned next time.
During the power outage the panel meter goes to pause and continues measuring from the values it had before the power outage. Volume is uncorrected value.

SOFT STARTER FAULT INDICATOR
When green, everything is OK.

START/STOP SWITCH
START AND STOP
YOUR SAMPLING

MEASURING UNIT FUSE

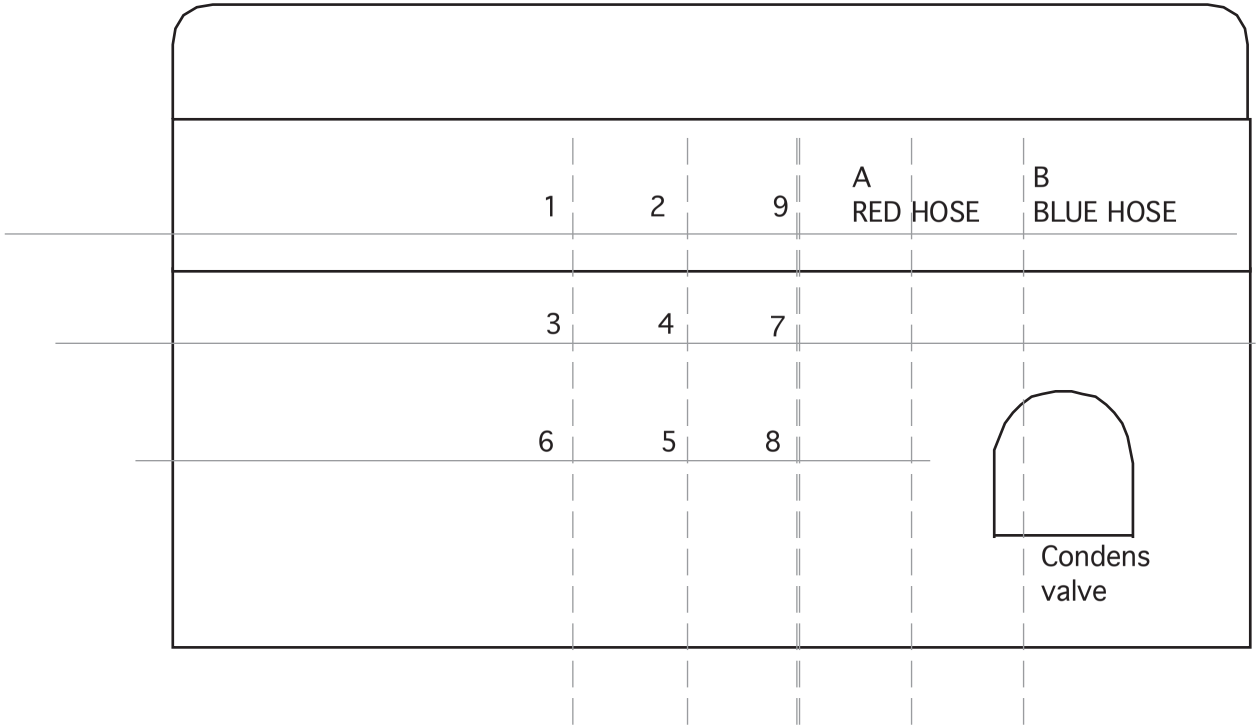
MEASURING UNIT (MU)



OPERATION PRINCIPLE

1. Pneumatic tubes are connected on both sides of Pressure difference orifice. Orifice is situated In the intake tube under filter.
2. Penumatic tubes are connected to Pressure Difference Transmitter (PDT). PDT transforms pressure difference to 4 - 20 mA message.
3. This 4 - 20 mA message is routed via panel meter and data logger (QLC50).
4. Panel meter calculates and store this message into air flow (m3/h) and total volume (m3).
5. Data logger calculates also this message into air flow and total volume.
6. Into data logger there has been connected also Static pressure sensor, which measures static pressure of air before the measuring orifice.
7. There is also connected a temperature sensor to measure air temperature, before the orifice.
8. With all this information a correction calculation is done to convert the air flow into air flow in Standard Temperature and Pressure (STP) which is demanded by CTBTO.
9. After all measurements and calculation the data string is produced into RS232 and RS 485 ports.
10. In RS485 port the data string is in a form of CTBTO specifications.
11. If properly connected to PC, you can ask for this data string by writing <POLL> ENTER
12. Same out put is done automatically every time, when sampler is START or STOPPED. Also when either of two tamper swithces is activated the same data string is sent automatically.
13. You can notice that there are several connectors in MU. There are connectors for meteorological sensors as you can notice in att.

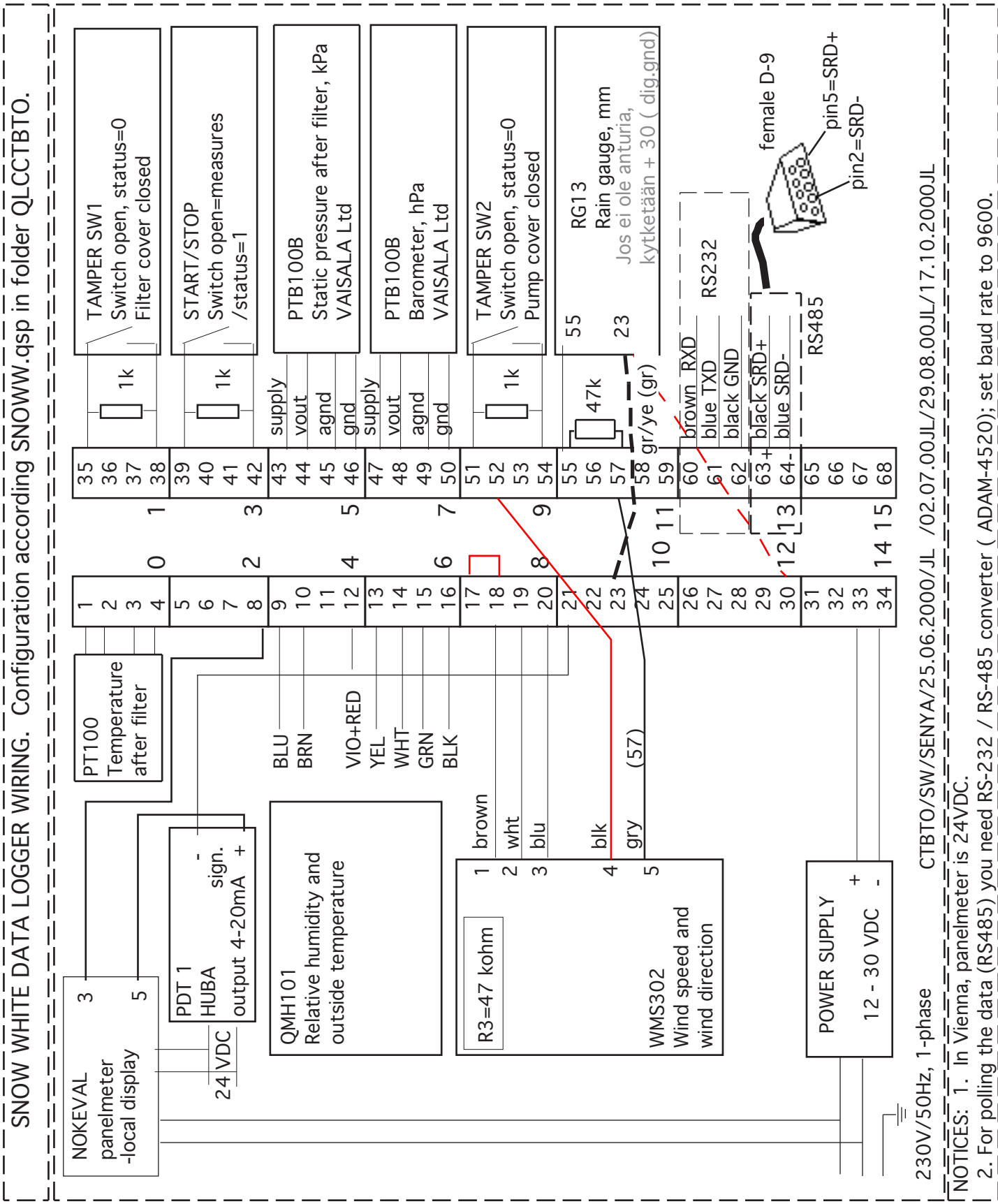
BOTTOM VIEW



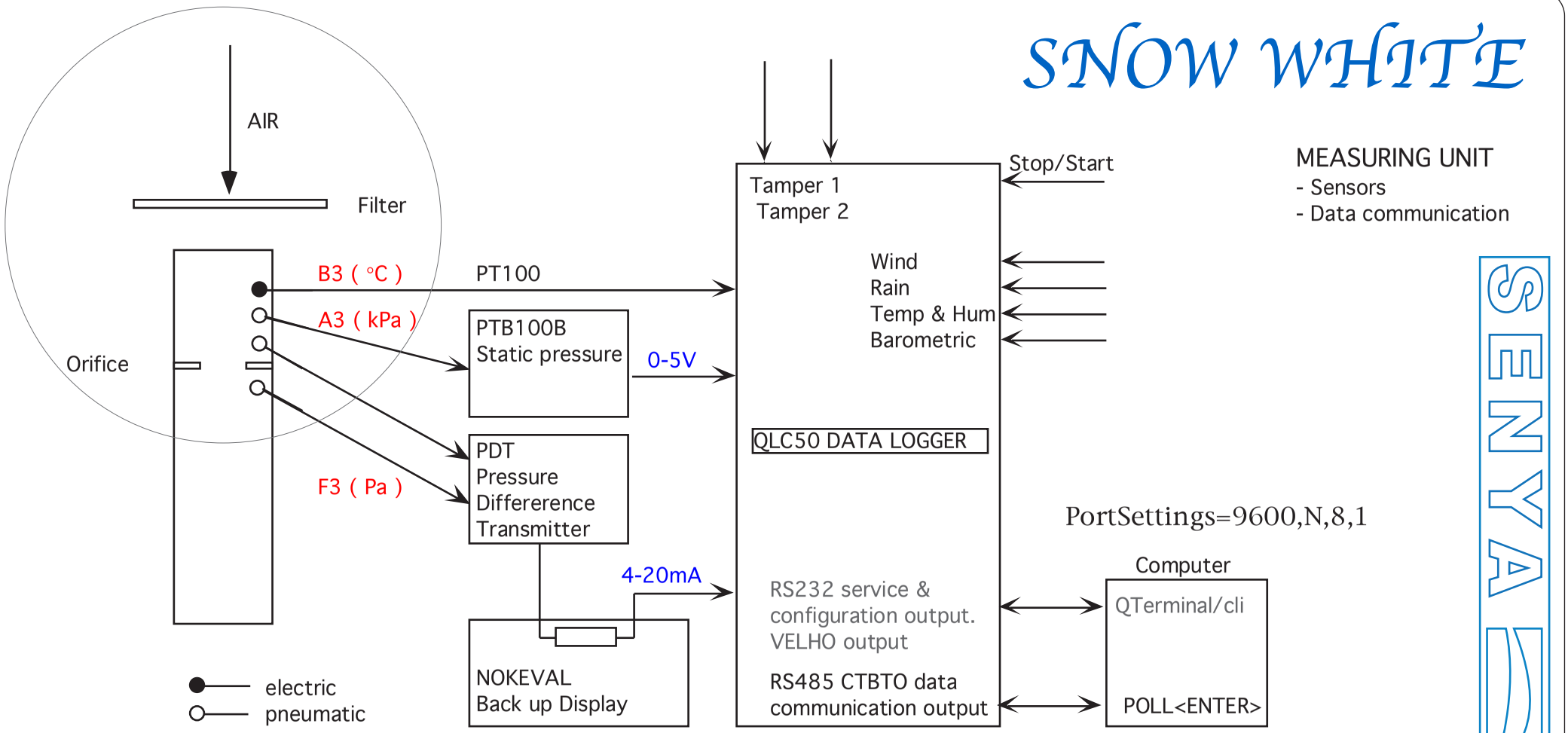
1. START/STOP+LAMP+RESET, 5 PIN
2. TAMPER SWITCES, 4 PIN
3. WIND SENSOR, 5 PIN
4. TEMP+HUM, 10 PIN
5. RAIN,
6. PT100, 4 PIN
7. RS485, 5 PIN
8. RS232, 5 PIN
9. POWER SUPPLY, 230V/50HZ
A. VACUUM, LOWER
B. VACUUM, HIGER

SNOW WHITE Measuring Unit (MU) connectors

VIRHE RS-LIITINTIEDOISSA



SNOW WHITE

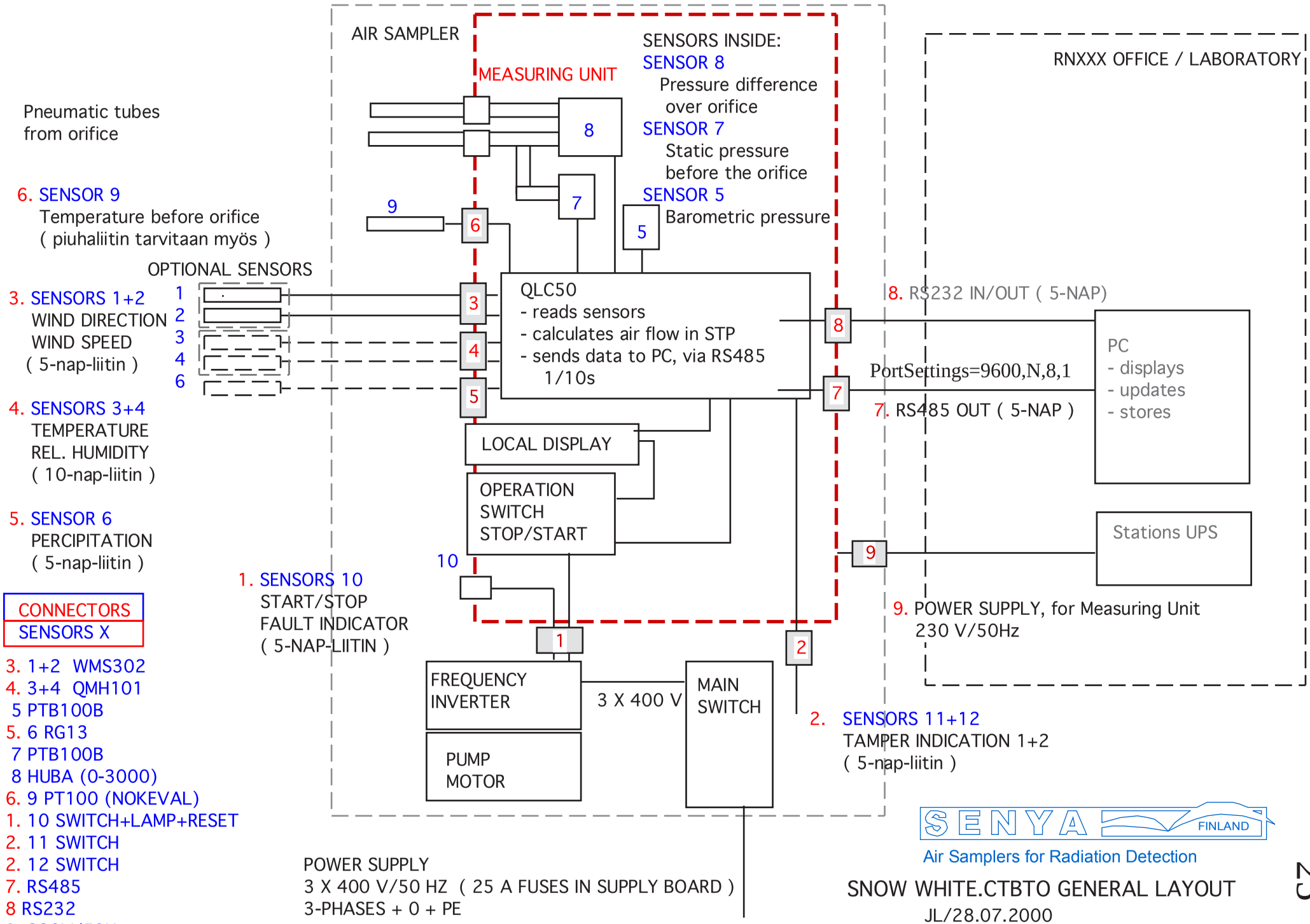


SENYA FINLAND

start of data
start date
start time
sampling duration
sampler status
pressure difference
average flow rate
sampled air volume
temp after filter
static press after filter
outside temp
average wind dir
average wind speed
Barometric
relative humidity
rainfall
tamper 1
tamper 2
update date
update time
end of data

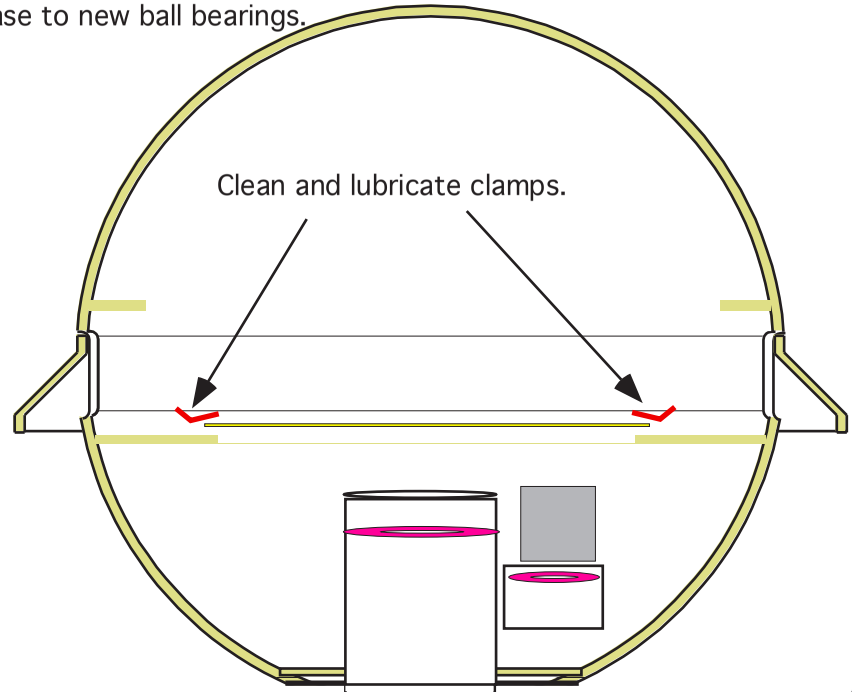
S 2000/07/22 18:49:01 01:53:00 1 784 539.8 1048.2 22.3 103.2 23.0 36 0.5 1031.6 58.7 0.0 0 0 2000/07/22 20:42:05 E

(11.527*F3^0.4901)*SQRT((101.325/A3*(273.15+B3)/293.15))*A3*2.69578/(273.15+B3) = dm3/s (STP)

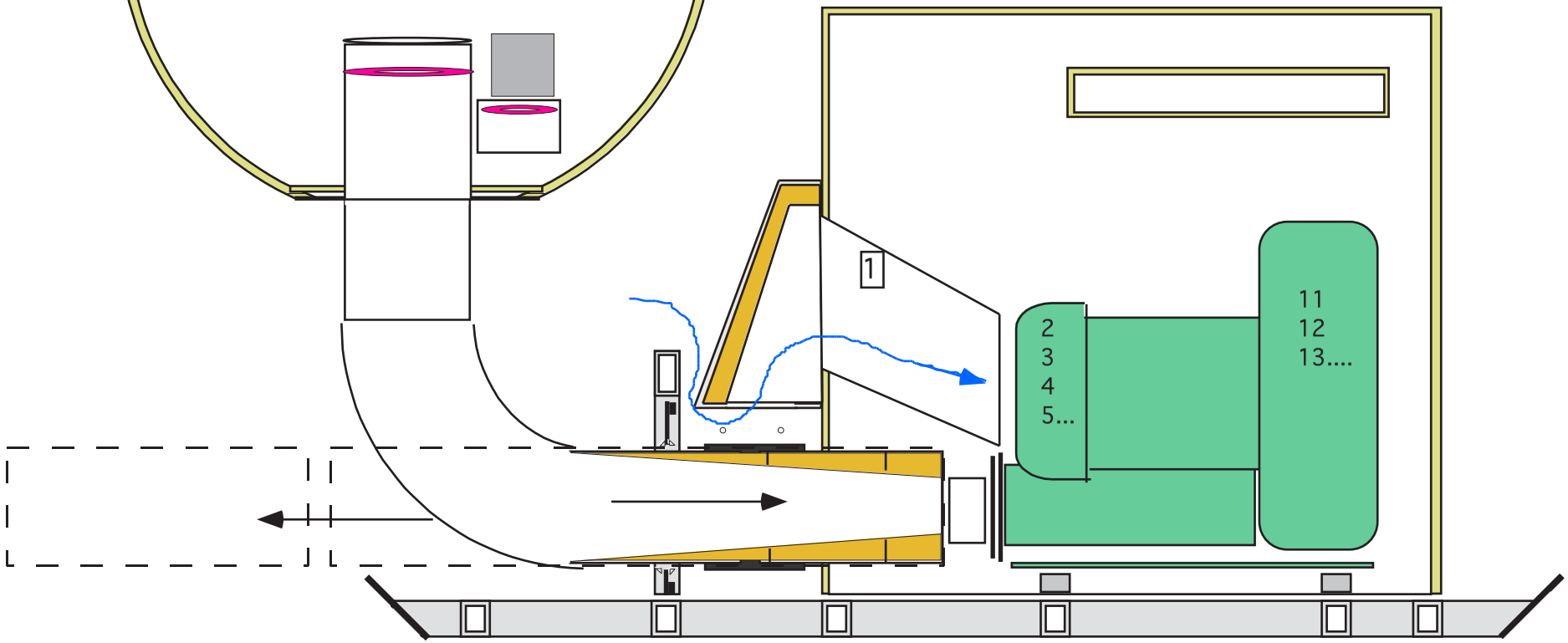

AIR SAMPLER
MEASURING UNIT
SENSORS INSIDE:
SENSOR 8
Pressure difference over orifice
SENSOR 7
Static pressure before the orifice
SENSOR 5
Barometric pressure
Pneumatic tubes from orifice
6. SENSOR 9
Temperature before orifice
(piuhaliitin tarvitaan myös)
OPTIONAL SENSORS
3. SENSORS 1+2
WIND DIRECTION
WIND SPEED
(5-nap-liitin)
4. SENSORS 3+4
TEMPERATURE
REL. HUMIDITY
(10-nap-liitin)
5. SENSOR 6
PERCIPITATION
(5-nap-liitin)
QLC50
- reads sensors
- calculates air flow in STP
- sends data to PC, via RS485 1/10s
LOCAL DISPLAY
OPERATION SWITCH STOP/START
1. SENSORS 10
START/STOP
FAULT INDICATOR
(5-NAP-LIITIN)
FREQUENCY INVERTER
3 X 400 V
MAIN SWITCH
PUMP MOTOR
2. SENSORS 11+12
TAMPER INDICATION 1+2
(5-nap-liitin)
RNXXX OFFICE / LABORATORY
8. RS232 IN/OUT (5-NAP)
PortSettings=9600,N,8,1
7. RS485 OUT (5-NAP)
PC
- displays
- updates
- stores
Stations UPS
9. POWER SUPPLY, for Measuring Unit
230 V/50Hz
CONNECTORS
SENSORS X
3. 1+2 WMS302
4. 3+4 QMH101
5 PTB100B
5. 6 RG13
7 PTB100B
8 HUBA (0-3000)
6. 9 PT100 (NOKEVAL)
1. 10 SWITCH+LAMP+RESET
2. 11 SWITCH
2. 12 SWITCH
7. RS485
8 RS232
9. 230V/50Hz
POWER SUPPLY
3 X 400 V/50 HZ (25 A FUSES IN SUPPLY BOARD)
3-PHASES + 0 + PE
SENYA
FINLAND
Air Samplers for Radiation Detection
SNOW WHITE.CTBTO GENERAL LAYOUT
JL/28.07.2000

INSIDE VIEW of SNOW WHITE.

SNOW WHITE pump is similar to HUNTER pump. Please look at the enclosed pictures of changing the ball bearings to HUNTER.
In SNOW WHITE you don´t have to remove the pump from sampler. You can do the service in place.
Motor end ball bearing is very tight and you should warm it before removing and installing.
Always put grease to new ball bearings.



1. Loosen screws and remove cooling air intake tube.
2. Loosen screws and remove motor fan cover.
3. Pull out plastic fan
4. Open screws and remove motor end plate.
5. Warm up the ball bearing.
6. Remove ball bearing.
7. Warm new ball bearing and install it.
8. Install motor end plate.
9. Install motor plastic fan.
10. Install fan cover.
11. Loosen 4 screws in the middle of the turbine.
12 Loosen bolts of turbine.
13. Gently remove turbine cover.
14. Remove ball bearing.
15. Install new ball bearing
16. Gently install turbine cover. With thin metal stick placed in the middle holes adjust the the holding ring in place when installing turbine cover.
17. Check from cooling fan that the turbine is rolling easily, if not hit with plastic hammer to turbine end cover and check again.



NASH- ELMO-G PUMP
CHANGING BEARINGS

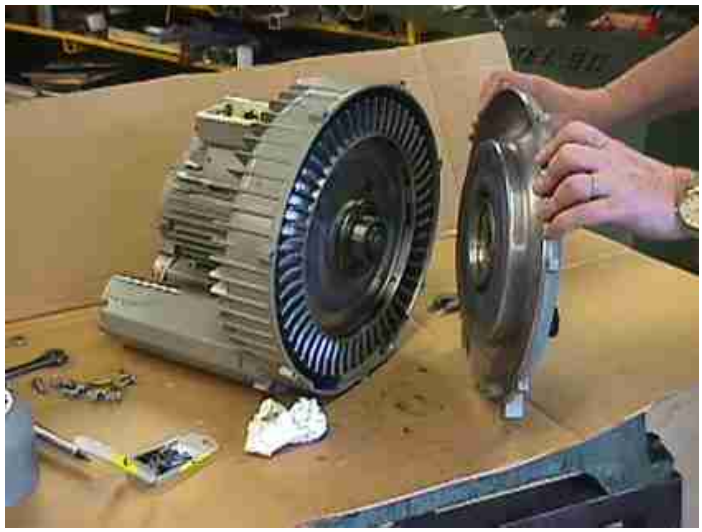
1

2

3

4

5



6

7

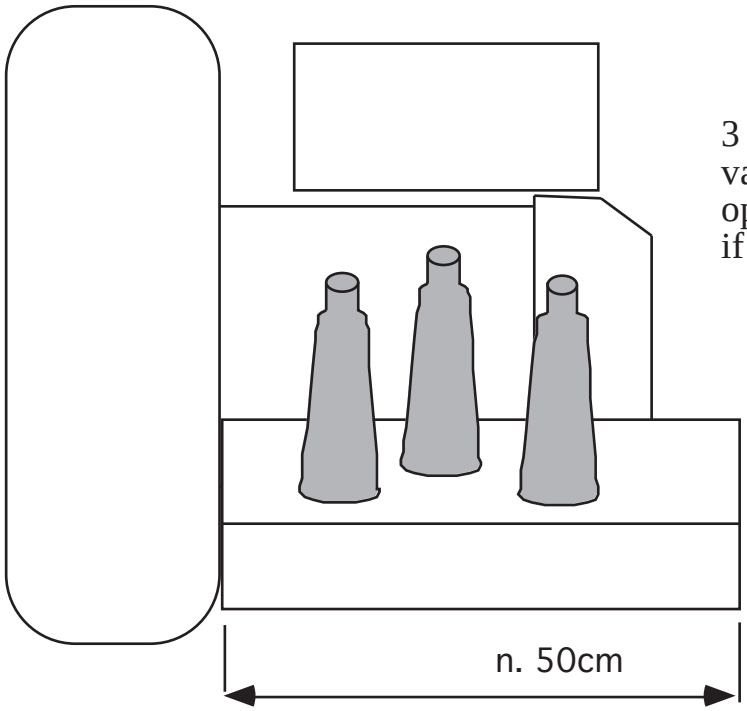
SNOW WHITE
CHANGING BALL BEARINGS

PUMP IN SNOW WHITE IS SIMILAR TO HUNTER PUMP.
DISMANTLING IS DONE THE SAME WAY AS WITH HUNTER.
HERE YOU CAN SEE HOW TO REPLACE NEW BALL BEARING IN SAFT.
DO THIS CHANGE ALWAYS FIRST, BECAUSE YOU HAVE TO HIT IT QUITE HARD.

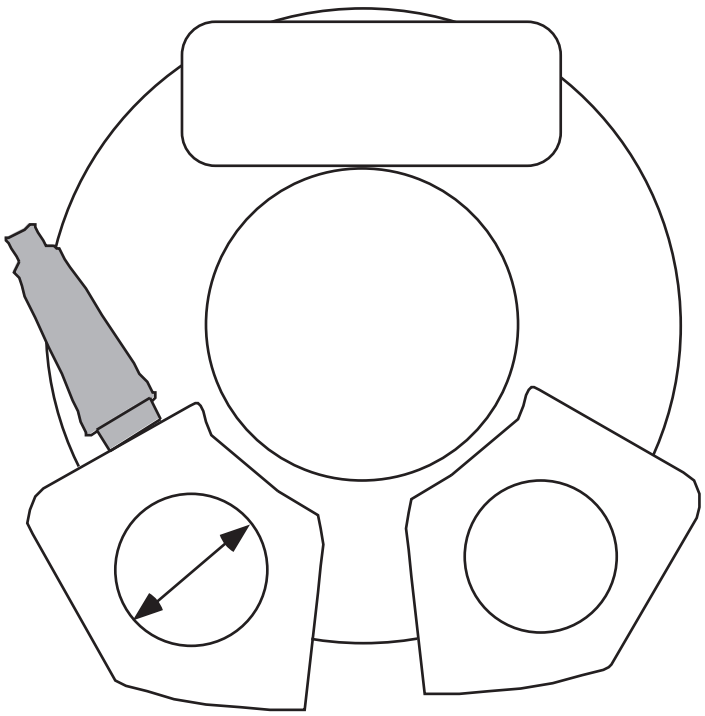
THEN OPEN THE TURBINE END OF PUMP.
LOOSEN FIRST FOUR CROSS HEADED SCREWS IN THE MIDDLE OF PUMP.
THEN OPEN BOLTS.

TAKE OFF THE BEARING AND HOLDER.
TAKE OFF BEARING FROM HOLDER.
WIPE CLEAN.
GREASE NEW BEARING AND PLACE.
ASSEMBLE PUMP AND CHECK THAT IT REVOLVES FREELY, IF NOT HIT WITH RUBBER OR PLASTIC HAMMER ON THE TURBINE CENTER COVER.

Automatic overload valves on intake of pump



3 pieces overload valves. These valves open automatically if filter is too filled



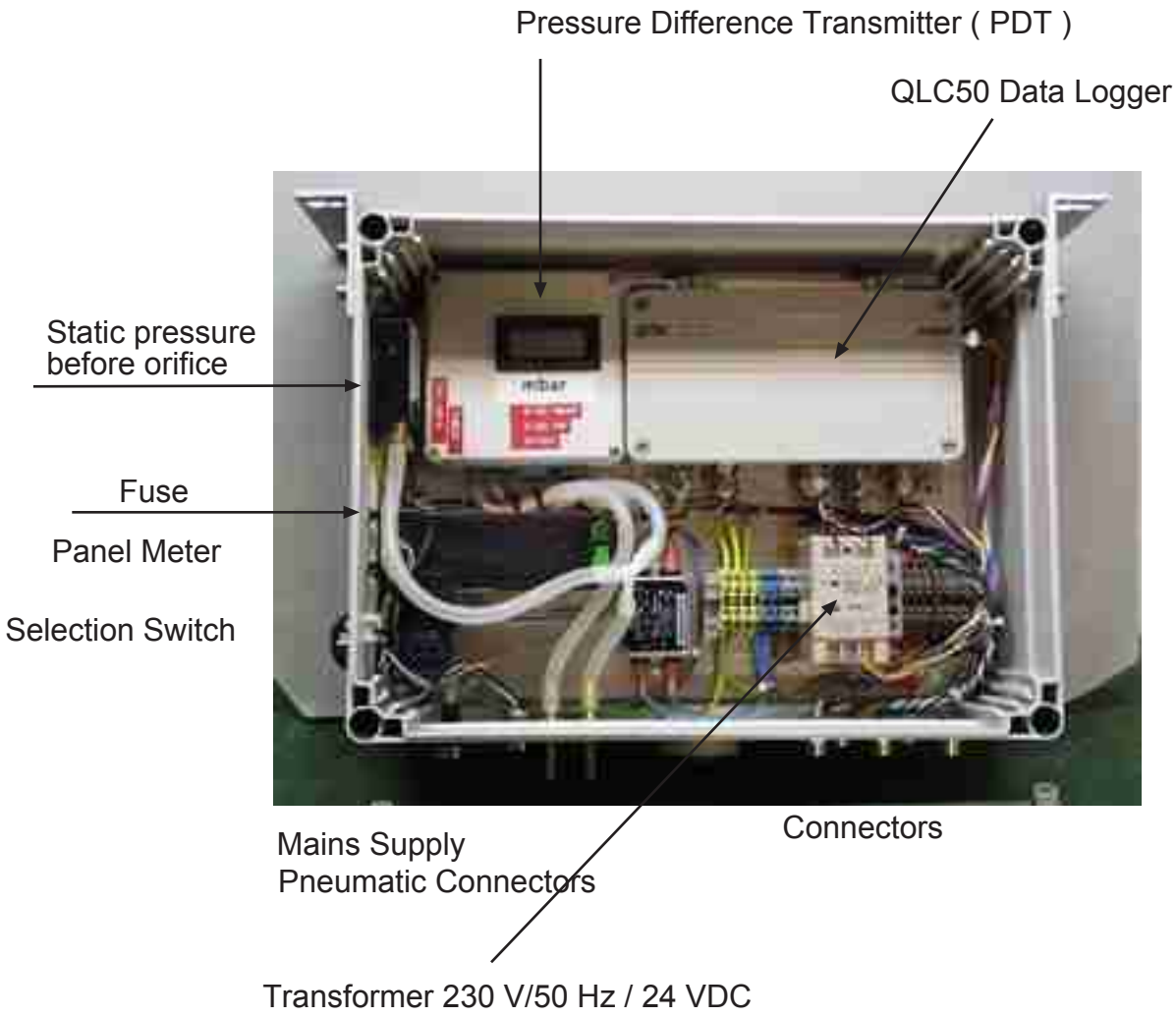
Easiest way to lift sampler on site

Somrtimes sampler is installed inside a hut.

Sampler is delivered with plastic flexible exhaust tube,but it is always a good practice to replace it locally with a stainless steel Ø205 tube.

Installed on concrete platform large enough quarantees you that you do not have to work on mud in rainy days. On right the motor cover has been lifted away for easy installations.

MEASURING UNIT (MU)



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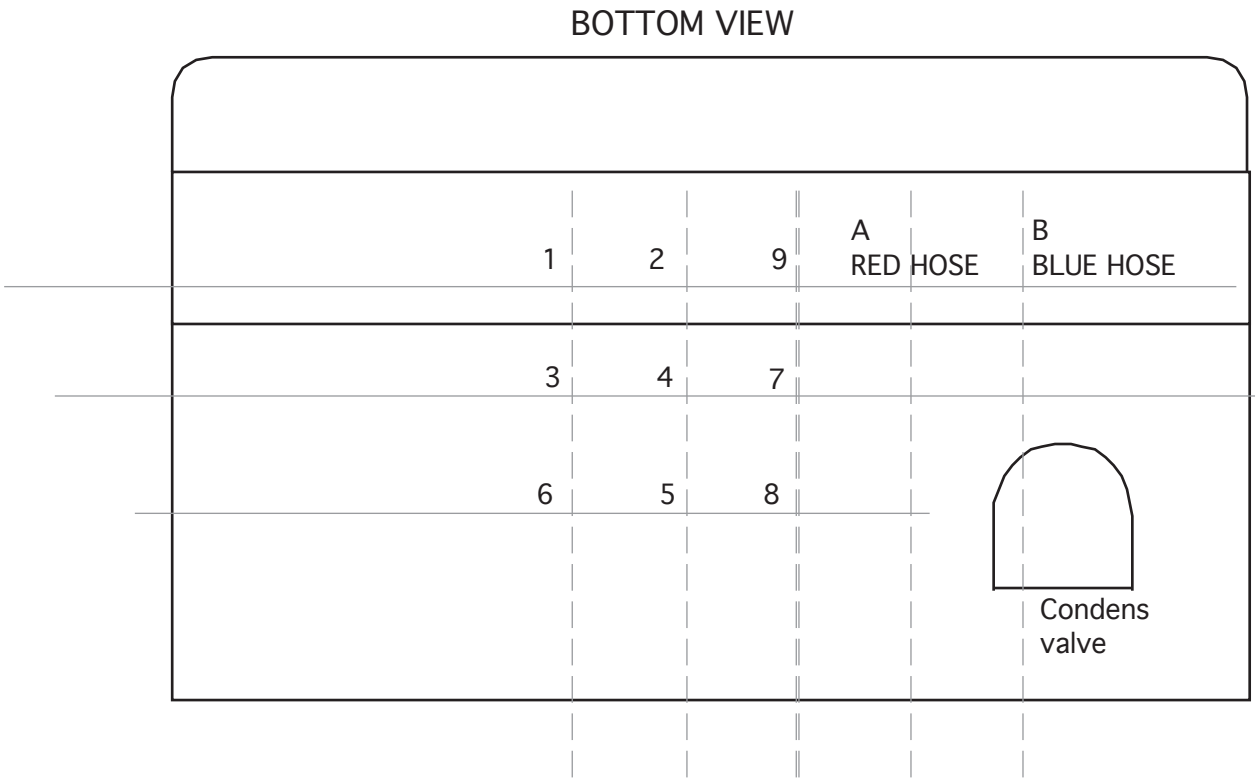

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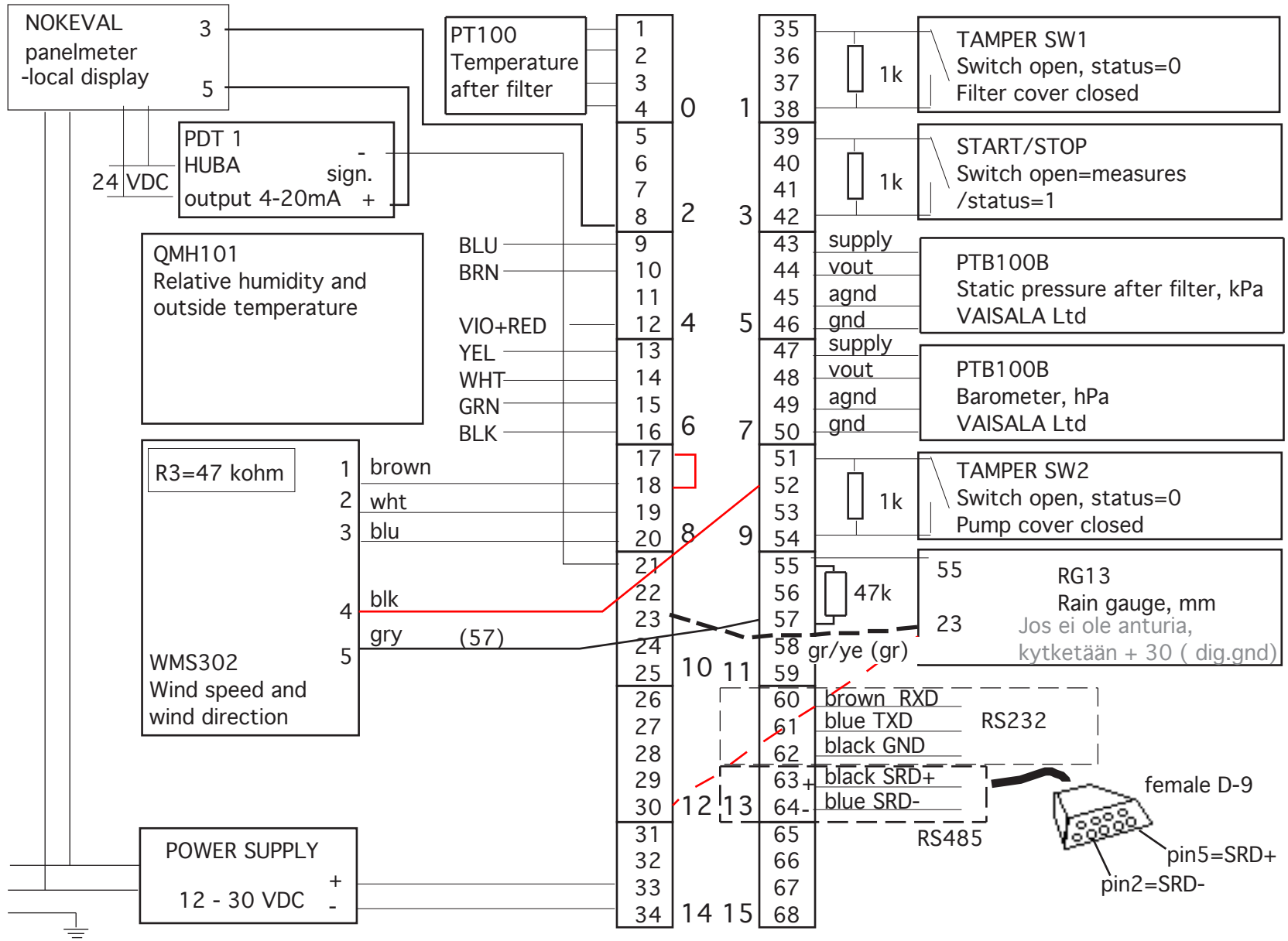
A. VACUUM, LOWER
B. VACUUM, HIGER

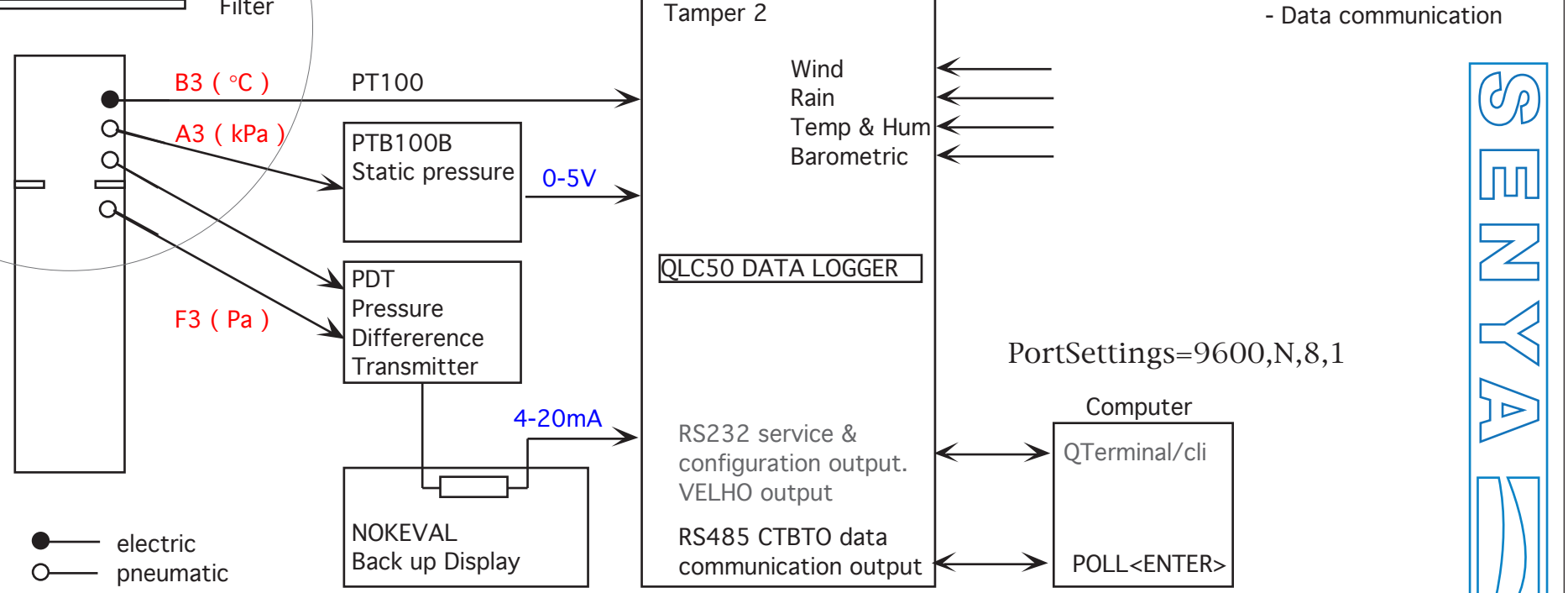
SNOW WHITE Measuring Unit (MU) connectors

SNOW WHITE DATA LOGGER WIRING. Configuration according SNOWW.qsp in folder QLCCTBTO.



CTBTO/SW/SENYA/25.06.2000/JL /02.07.00JL/29.08.00JL/17.10.2000JL

NOTICES: 1. In Vienna, panelmeter is 24VDC.
2. For polling the data (RS485) you need RS-232 / RS-485 converter (ADAM-4520); set baud rate to 9600.



start of data
start date
start time
sampling duration
sampler status
pressure difference
average flow rate
sampled air volume
temp after filter
static press after filter
outside temp
average wind dir
average wind speed
Barometric
relative humidity
rainfall
tamper 1
tamper 2
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update time
end of data

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